



present. The field is dropping some interests, adding others, and changing its appraisal of the importance of many of its subdivisions. Typical introductions to general and to highly specific studies have been reproduced to give the reader a "feel" for the complexity and breadth of the general field. Other quotations have suggested background points of view of supporting philosophies useful in orientation.

It is now high time to call attention to the nature of the present book itself. Within reason, what can the reader hope to gain from a study of the twenty-six chapters contained within the covers of the present volume? Will he find here safe but effective sedatives which will soothe him into thinking what he has thought and knowing what he already knows? Or will he, on the other hand, find bright, alarming, radical points of view attractive for the moment but fraught with the independability of the temporary? Will he find final, potent secrets which make a royal road to learning? Will he find a single point of view inhospitable to differences of opinion, an assortment of quotations overlapping each other to the extent that only a thinly veiled piece of psychology propaganda is available to him? Or will he find contradictions crowding upon contradictions so that, the book itself failing to make up its mind about anything, he too will finish its study more confused than he was before he began its study. To all of these questions the answer is, in fairness, "No."

This book of readings has been compiled by many educational psychologists. Another group of teachers might have made a different collection of writings—perhaps a better one. With many thousands of articles to choose from, our modest list must have omitted many well deserving of a place in these pages. The present readings, however, contain a minimum of feeble writing. It is hoped that a fair perspective of current thought is contained in the book. No collaborator of this book agrees with all that is in it, nor is the reader expected to. It is unfortunate that the student of educational psychology cannot compare and contrast the substance of this volume with one of similar purpose published, let us say, twenty years ago. Similarly, many of the pages of this book will no doubt look quaint, naïve, and innocent when compared with the educational psychology of 1957.



## CHAPTER II<sup>1</sup>

### BIOLOGICAL AND PHYSIOLOGICAL FOUNDATIONS OF BEHAVIOR

*J. A. Gengerelli, University of California at Los Angeles*

#### I. Introduction

Some four hundred odd years of scientific experience have taught us that the most fruitful way of looking upon the living organism is as a physico-chemical system. Chemical analysis reveals that all organisms consist of elements which are familiar to the inorganic chemist in his study of such things as oil, coal, rocks, and gases. Some of the more common elements found are *carbon, nitrogen, oxygen, hydrogen*. It is true, of course, that the units of structure of living organisms,—the bricks making up the house, as it were—are very complex molecules containing many of the chemical elements arranged in very complex patterns. The fact remains, however, that these elements constituting living protoplasm do not differ from those we find in nonliving matter.

We thus see that the organism is a physicochemical system existing in a physicochemical world. It is, indeed, an integral part of the world in every conceivable respect. Under these conditions it would be most surprising if there did not exist the closest relationship between the organism and what is known as its environment. The nature of this relationship, that is to say, the question of the mutual influence of the organism upon environment and the environment upon the organism, constitutes a very large portion of the subject matter of psychology.

A study of this domain of knowledge is facilitated by conceiving the organism as being subdivided into three component parts which are indispensable if it is to be sensitive to the influences of its environment and is to react adequately to them. These are (1) the receptors, (2) the conductors or nervous system, and (3) the effectors. These parts of the body are successively involved in any reaction between the environment and the organism. The receptors are the hypersensitive receiving points either upon the surface or within the interior of the body upon which the stimulating energies impinge; the nervous system conducts the disturbance to the various parts of the body; the effectors and their reaction to the propagated disturbance form the last link in the chain of complicated processes which occur when energy in some form stimulates the organism.

<sup>1</sup> The materials in this chapter supplement discussions along similar lines in many of our leading textbooks in educational psychology, including the following: Griffith, *An Introduction to Educational Psychology*, Chapters IX, X, and XIX; Jordan, *Educational Psychology*, Chapters II, IV, and XII; Powers and Uhl, *Psychological Principles of Education*, Chapter II; Gray, *Psychological Foundations of Education*, Chapters II and III; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter II; Benson, *et al.*, *Psychology for Teachers*, Chapters III and IV; Ogden and Freeman, *Psychology and Education*, Chapters II, III and IV; Leary, *Educational Psychology*, Chapter II; and Gates, *Psychology for Students of Education*, Chapters II and III.

We shall consider each of these segments in its turn, but the student must not be guilty of the common error of believing that because these three portions of the *action circuit* are considered in separate sections that they are somehow actually separate and distinct from each other. It must always be remembered that the division is made only in the interest of exposition.

## II. Heredity and Environment

Before proceeding to a description of the action circuit, it is well to consider certain aspects of the organism which are of the utmost importance for any adequate understanding of the complex relationships existing between it and the environment. Not all organisms are alike, either in their structure or in their reactions to a given environmental influence.

### I. MATERIALS OF HEREDITY AND THEIR OPERATION<sup>2</sup>

*H. S. Jennings*

... Genetics *may be defined as an account of the effects of the diversity of materials with which different individuals start life; the effects of the different materials received from their parents.* These effects are commonly classified as heredity, so that genetics deals largely with heredity. Heredity itself may be defined as the influence on the individuals of the materials which they receive from their parents at the beginning of their lives.

But the structures and qualities and activities of men and other organisms do not depend exclusively on the materials of which they are composed. They depend also—like the structures and qualities and activities of an automobile or other machine—on the way the materials are treated, on the conditions to which they are subjected. The characteristics, the methods of action, can be changed by changing the conditions under which the organism develops and lives. All this is often grouped under the effects of the environment; but it includes, as different aspects, what in man are called training, education, experience.

In trying to understand men or other organisms, one must always keep in mind these two great classes of influences: heredity, the influence of the different materials with which different individuals begin life; and the environment, or the influence of the way these materials are treated, the conditions to which they are subjected. Many of the differences between organisms are due to the former, many to the latter. It is the province of genetics to disentangle so far as possible the action and effects of these two classes of influences. Strictly considered, the province of genetics is the former: the effects of the different materials of which different individuals are composed. But the two classes of influences are so closely intertwined, their results so fully integrated, that one cannot be dealt with separately from the other.

Long ago it was discovered, as everyone knows, that a new individual

<sup>2</sup> From H. S. Jennings, *Genetics*. New York: W. W. Norton & Company, Inc., 1935, pp. 3-4, 6-10, 11, 18-19, 21-22.

Certain general relations of chromosomes in parent and offspring must be held clearly in mind if one is to understand the further relations of chromosomes to heredity. It will be well to arrange these in a series of propositions:

(1) Every individual gets the chromosomes of its cells half from its mother, half from its father (or in some cases one less than half from its father).

(2) The chromosomes that it gets from one parent are like those that it gets from the other parent, except that from one parent it may get a large X-chromosome, while from the other it may get a small Y-chromosome (or none).

(3) In many organisms, the different chromosomes of the cell are of diverse types, unlike in size and form. Some are round, some are straight, some are V-shaped. This is true in the fruit fly, for example.

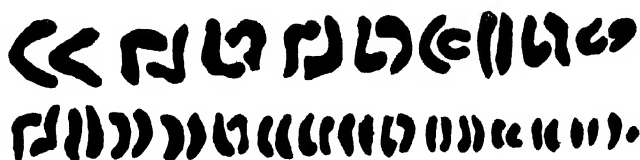


FIG. 3.—The twenty-four pairs of chromosomes in man, arranged in the order of size, after Evans and Swezy. The small unequal pair at the right end of the lower row are X and Y. (From Jennings, *Genetics*. Courtesy W. W. Norton & Company.)

(4) One of each type from the mother goes into the fertilized egg; also one of each type passes from the father into the fertilized egg.

(5) So the chromosomes of the fertilized egg, and of the individual that it forms, are in pairs, one chromosome of each pair from the father, one from the mother.

(6) In some organisms, as in the fruit fly, the two members of a pair remain side by side, throughout life, so that we find the chromosomes always in pairs. We know that one member of each such pair came originally from the father, the other from the mother.

(7) In the female, the two members of each pair are alike. The one that came from the mother is exactly similar to the one that came from the father; and this is true for all the pairs.

(8) But the male has one pair in which one of the chromosomes is smaller or of a different form, or is lacking entirely. This is the chromosome that we have called the Y, it comes from the father only.

(9) In place of this unequal pair the female has a corresponding equal pair of large chromosomes. The large one that corresponds to the Y of the male we have called X. But since the other one of this pair is just like it, we must call it X, too. That is, the female has a pair of X-chromosomes.

(10) The corresponding pair in the male has only one of these large chro-

mosomes that we call X, with or without another of different form that we call Y.

(11) Thus the correct way to express the difference between the sexes is that the female has two X-chromosomes, while the male has but one X-chromosome (accompanied in some species by a Y-chromosome).

## 2. THE RELATIVE IMPORTANCE OF HEREDITY AND ENVIRONMENT<sup>8</sup>

Many peculiarities of human individuals are the result of a particular kind of environment acting upon a particular type of gene. . . . This is particularly true for diseases, for pathological conditions of various kinds. On these matters there has been much misunderstanding, in consequence of the common fallacy that if a characteristic is affected by the environment it cannot be hereditary; that if it is hereditary, it cannot be influenced by the environment; in other words, that characteristics fall into two mutually exclusive groups in respect to these matters. Most diseases are greatly influenced by the conditions of life; yet most or all of them are likewise influenced by the nature of the individual's genetic constitution. For occurrence of tuberculosis, infection with the tubercle bacillus is required; and this is not a matter of genes, of heredity. But some combinations of genes yield a much better culture medium for the tubercle bacillus than do others. A person that has such a gene combination is much more likely to develop tuberculosis than another whose genes do not yield a good culture medium for the bacillus. A "hereditary" element is therefore involved. Yet the individual whose genes produce a body that is prone to tuberculosis need not develop the disease if he takes measures to prevent the bacillus from getting a foothold in his body. Doubtless there are many different types and grades of individuals with respect to this matter. Some offer a particularly favorable ground for the growth of the tubercle bacillus; others a less favorable ground, and so on through a series of grades, till we reach individuals that are almost or quite immune to attacks of the disease. The genetic constitution is therefore of much importance in connection with tuberculosis. Yet the environment is probably even more important. It is entirely conceivable that, by the discovery of measures effective in preventing the transmission and development of the bacillus, tuberculosis could be brought to disappear, so that genetic differences in susceptibility to it would be of no further consequence.

Similarly, some combinations of genes yield bodies that are much more prone than others to break out into that unregulated growth that is called cancer. In rats and mice, under the usual conditions of existence, individuals having certain sets of genes almost invariably develop cancer, while those with other genes do not. In other strains, with another set of genes, about half the individuals develop cancer; in still other strains, none. These differences are inherited in Mendelian fashion, showing that they are due to differences in one or two genes.

<sup>8</sup> From H. S. Jennings, *The Biological Basis of Human Nature*. New York: W. W. Norton & Company, Inc., 1930, pp. 147-148.

### III. Receptors

#### I. GENERAL <sup>4</sup>

Our first task is the analysis of the receptors (that is, the sense organs), for these are the only places through which the forces of the world outside can reach the nervous system in order to excite its activity.

"The world is so full of a number of things  
I'm sure we should all be as happy as kings."

But in order to attain this fortunate result it is necessary that we should be able to discriminate the essential from the unimportant elements of this environing complex, and to adjust our own behavior in relation thereto.

Protoplasm in its simplest form is sensitive to some sorts of mechanical and chemical stimulation. In fact . . . all of the so-called nervous functions are implicit in undifferentiated protoplasm. But the bodies of all but a few of the lowest organisms are protected by some sort of a shell or cuticle from excessive stimulation from the outside, and individual parts of the surface are then differentiated in such a way as to be sensitive to only one group of excitations while remaining insensitive to all other forms. Thus arose the sense organs, each of which consists essentially of specialized protoplasm which is highly sensitive to some particular form of energy manifestation, but relatively insensitive to other forms of stimulation. Each sense organ possesses, in addition, certain accessory parts, adapted to concentrate the stimuli upon the essential sensitive protoplasms, to intensify the force of the stimulus, or to so transform the energy of the stimulus as to enable it to act more efficiently upon the essential end organ.

#### 2. CLASSIFICATION OF RECEPTORS <sup>5</sup>

Sherrington, whose analysis with some modifications is here adopted, recognizes three types of sense organs or receptors: (1) the *interoceptors*, or visceral receptive organs, which respond only to stimulation arising within the body, chiefly in connection with the processes of nutrition, excretion, etc., (2) the *exteroceptors*, or somatic sense organs, which respond to stimulation arising from objects outside the body; (3) the *proprioceptors*, a system of sense organs found in the muscles, tendons, joints, etc., to regulate the movement called forth by the stimulation of the exteroceptors. This third group is largely subsidiary to the somatic group, or exteroceptors.

#### 3. THE EXTEROCEPTIVE GROUP <sup>6</sup>

The sense organs of this group are stimulated by objects outside the body and typically call forth reactions of the whole body, such as locomotion, or

<sup>4</sup> From C. J. Herrick, *Introduction to Neurology*, 1934, pp. 82. Courtesy of W. B. Saunders Company.

<sup>5</sup> From C. J. Herrick, *op. cit.*, p. 90.

<sup>6</sup> From C. J. Herrick, *op. cit.*, p. 93.

of its parts, so as to change the relation of the body to its environment. This group includes a system of general cutaneous sense organs, some of deep sensibility, and some of the higher sense organs. The cutaneous exteroceptors comprise a very complex system whose analysis has proved very difficult. The correlation of the data of physiological experiment with the anatomical structure of the cutaneous end organs is still somewhat problematical and the assignment of end organs here to the various cutaneous senses should be regarded as provisional rather than as demonstrated.

#### 4. THE PROPRIOCEPTIVE GROUP <sup>7</sup>

*F. A. C. Perrin*

The receptive organs of the body, such as the semicircular canals of the ear, as well as those found in the muscles and tendons and on the joint surfaces, are called proprioceptors because their adequate stimuli are furnished by (or are the "property" of) the organism itself. The canals contain a liquid, variations in the pressure of which presumably stimulate adjacent sensitive nerves. The proprioceptors embedded in the muscles and tendons are stimulated by the surrounding tissue. The stimulations become strong when the muscles are active or tense. The proprioceptors on the joint surfaces are stimulated by movements of the joints.

The proprioceptive system can be compared with the differential of an automobile, a device that automatically regulates the fine movements of a car by distributing the power in correct proportions to the rear wheels. Although gross motor responses are effected by exteroceptors, the muscular co-ordination that normally characterizes these responses is effected by the proprioceptors. The latter are divided into two classes, the organs of static sense, and the kinesthetic organs. Each has a special function in effecting co-ordination.

##### i. The Organs of Static Sense <sup>8</sup>

*F. A. C. Perrin*

The organs of static sense and bodily equilibrium are the semicircular canals, including the saccule and utricle of the inner ear. They regulate automatically the responses of the organism whereby its equilibrium is maintained, illustrated by the balancing reflexes of the trained (or untrained) tight rope walker; and they regulate in general all efforts of the organism to maintain and alter its bodily postures and attitudes. As stated above, it is commonly assumed that the stimulus for the organ of the static sense is its own liquid, pressing with varying and changing degrees of intensity at different places on the confining walls of the organ as the head moves. By setting the appropriate neuromuscular mechanism in action, the organ co-ordinates adjustments that otherwise would be jerky and awkward. It is usually held that the receptors

<sup>7</sup> From F. A. C. Perrin, *Psychology*. New York: Henry Holt and Company, 1932, pp. 103-104.

<sup>8</sup> From F. A. C. Perrin, *op. cit.*, p. 104.

of the semicircular canals are activated in turning or rotary movements, while the saccule and utricle are activated in straight line or rectilinear movements.

In connection with semicircular canal functions, Titchener mentions the danger attending deaf mutes who indulge in rides on merry-go-rounds, or in deep water diving. In the one case they tend to sit upright, irrespective of the speed at which they travel, whereas the normal person unconsciously "banks" in toward the center; and consequently they are in danger of being thrown off. In the case of deep water diving the deaf mute is in danger of losing his spatial orientation and consequently drowning. In both cases, of course, the deafness is purely incidental for the injury to the canals, located near the organ of hearing, is the cause of the difficulty.

## ii. The Kinesthetic Organs<sup>9</sup>

F. A. C. Perrin

The kinesthetic organs are located in the muscles and tendons, and on the joint surfaces. The term "kinesthetic" literally means "feeling of motion," but since we are seldom conscious of the sensations caused by these organs our chief interest is in their functions. The endings, or functionally the beginnings, of afferent neurons (that is, nerve cells which carry impulses from the receptors to the brain or spinal cord) are found in the muscles, wound spirally around individual muscle cells. On tendon surfaces are found branch-like beginnings of afferent nerves, and the synovial membrane lining the joints is supplied with receptors. We have already noted that kinesthetic receptors are stimulated by the contraction of muscle cells, the tension of the tendons, and the rubbing of one joint surface on another when some muscular act is taking place. Kinesthetic stimuli are thus forms of contact stimuli.

Kinesthetic receptors function by generating nerve impulses that regulate muscular activity. Their importance is demonstrated in the familiar mirror-tracing experiment, in which a subject traces some simple design, usually a star, with a pencil, on the design reflected from the mirror. Under the conditions of the experiment the visual cues are reversed, thus breaking up the established visual-kinesthetic cues, and making the execution of the act quite difficult. These cues are combined through habit, for in the everyday acts of dressing and shaving before a mirror the same conditions obtain that characterize the mirror-tracing experiment.

In the disease *tabes dorsalis*, also called *locomotor ataxia* a degeneration in the spinal cord primarily affects nerve tracts from the cutaneous receptors and proprioceptors. The resulting symptom is an extreme clumsiness of gait and of manipulatory habits. When the normal person with both legs or feet "asleep" tries to walk, he practically duplicates the tabetic gait. In the absence of kinesthetic cues from his feet and legs, he relies on visual cues that are inadequate for smooth or co-ordinated muscular activity.

<sup>9</sup> From F. A. C. Perrin, *op. cit.*, pp. 104-106.

5. THE INTEROCEPTIVE GROUP<sup>10</sup>*C. J. Herrick*

The general visceral systems are without highly specialized end organs and are innervated through the sympathetic nervous system. Their reactions are chiefly unconsciously performed.

*Organs of hunger.*—The stimulus is strong periodic contractions of the muscles of the stomach. Hunger is apparently a variety of muscle sense, but other factors are also present.

*Organs of thirst.*—The specific stimulus here is probably a drying of the pharyngeal mucous membrane, together with more general conditions.

*Organs of nausea.*—The stimulus is probably an antiperistaltic reflex in the digestive tract.

*Organs of visceral pain.*—Hurst (1911) concludes that the only immediate cause of true visceral pain is tension and, so far as the alimentary canal is concerned, this tension is exerted on the muscular coat, not on the mucous lining. But free nerve endings of the mucosa . . . may share in exciting these sensations, for these membranes may well be sensitive to stretching, even though quite insensitive to simple pressure or cutting . . . Livingstone (1930) emphasizes muscular spasm of the blood vessels as a frequent cause of visceral pain, and Bremer (1928) discusses spasms of cerebral blood vessels as probable causes of migraine and other painful diseases. . . .

*Organs of obscure abdominal sensations* associated with strong emotions of fright, anger, affection, etc., characterized (probably correctly) by the ancients by such expressions as "yearning of the bowels" etc., the stimulus is probably a tonic contraction of the unstriated visceral musculature.

The nerve endings of the general visceral receptors are usually either simple terminals in the visceral muscles or free arborizations in or under the various mucous surfaces, without the development of specialized accessory cells to form differentiated sense organs.

The student will note from the foregoing descriptions that the classical doctrine of the "five senses" has been definitely superseded. There are more nearly twenty than five.

IV. The Conductors<sup>11</sup>*C. J. Herrick*

The functions of irritability, conduction, and correlation are the most distinctive features of the nervous system. Like the rest of the body, the nervous tissues are composed of cells, the irritability of whose protoplasm is of diverse sorts in adaptation to different functional requirements. Each sense organ, for instance, is irritable to its own adequate stimulus only. The functions of correlation and integration of bodily actions cannot be carried on

<sup>10</sup> From C. J. Herrick, *op cit.*, pp. 102-103.

<sup>11</sup> From C. J. Herrick, *op. cit.*, pp. 39, 42, 44.



by the nerve cells as individuals, but they are effected by various types of connections between the different cells in the nerve centers. The character of any particular correlation, in other words, is a function of the pattern in accordance with which the nerve cells concerned are connected with one another and with the end organs of the reflex arcs involved. The conducting function of nerve cells is, perhaps, their most striking peculiarity, and their very special forms are due largely to the fact that their business is to connect remote parts of the body so that these parts can co-operate in complicated movements.

### I. THE NEURON

All the tissues of the body are fabricated of cells of diverse sorts. In early embryonic stages these cells are simple in form and structure. The embryonic nerve cell, or neuroblast, is oval with a large nucleus and scanty cytoplasm. In the further development of the nervous tissues the individuality of these

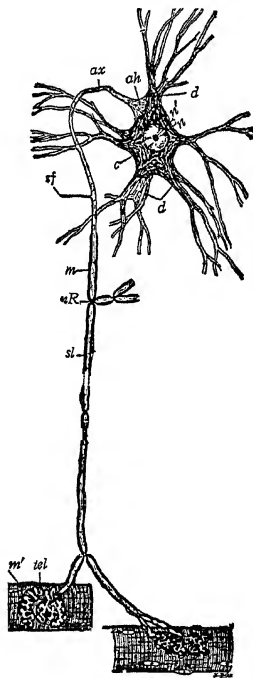


FIG. 4.—Diagram of a motor neuron from the ventral column of gray matter in the spinal cord. The cell body, dendrites, axon, collateral branches, and terminal arborizations in muscle are all seen to be parts of a single cell and together constitute the *neuron*: *ah*, axon hillock free from chromophilic bodies; *ax*, axon; *c*, cytoplasm of cell body containing chromophilic bodies, neurofibrils, and other constituents of protoplasm; *d*, dendrites; *m*, myelin (medullary) sheath; *m'*, striated muscle-fiber; *n*, nucleus; *n'*, nucleolus; *nR*, node of Ranvier where the axon divides; *sf*, collateral branch; *sl*, neurilemma (not a part of the neuron); *tel*, motor end-plate. (After Barker, from Bailey's *Histology*, by permission of the publisher, Williams & Wilkins Company.)

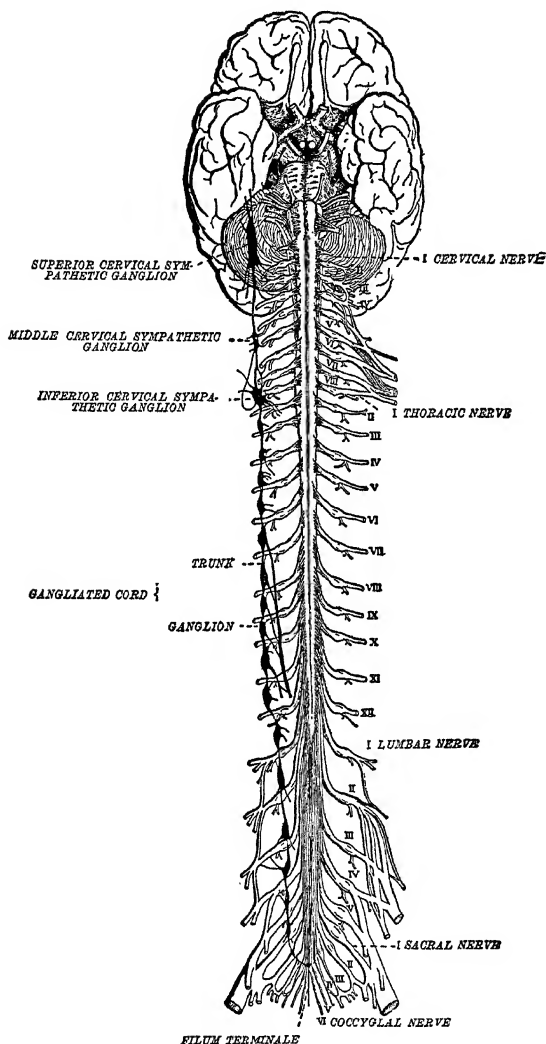


FIG. 5.—The human central nervous system from the ventral side, illustrating also its connections with the cranio-spinal nerves and with the sympathetic nervous system, the latter drawn in black. (From Morris' *Human Anatomy*, being a composite drawing in part after Allen Thompson from Rauber.)

cells is never lost; though they may be linked one with another in most intricate patterns and though no nerve cell can perform its functions independently of the other cells with which it is thus joined, yet it retains the essential feature of a distinct cell (Fig. 4).

The mature nerve cell is the *neuron*. During the past forty years the doctrine of the neuron has been a storm center of theorists. The essentials of this doctrine in its present form can be simply stated: The nervous system, like the rest of the body is composed of cells. No cell in the body is entirely independent of other cells and the interrelationships of nerve cells are peculiarly intimate.

The forms of neurons are determined partly by their internal structure, by the amount of cytoplasm and its composition, and partly by the number of fibrous processes, the length of these fibers and the direction taken by them. The processes are of two sorts, termed dendrites and axon (neurite, or axis-cylinder process). The dendrites may be very numerous, single, or rarely absent. The axon, with very rare exceptions, is single and it usually is different in structure from the dendrites so as to be readily recognized.

The dendrites are usually short, much branched and thorny, and their protoplasm is structurally similar to that of the cell body (Fig. 5), while the axon is usually long, smooth, less branched and more slender, with a characteristic structure adapted for rapid transmission of the nervous impulse for great distances. This is the most common form, termed (type I) by Golgi, . . . but the axon may be short and much branched (type II), . . . and there are numerous other forms which do not conform to either of these types.

## 2. GROSS ANATOMY OF THE NERVOUS SYSTEM<sup>12</sup>

*Peter Sandiford*

*Subdivisions of the nervous system.*—Having studied the microscopic units of the nervous system and the ways in which they are connected, it now remains to name the various parts of the nervous system as they present themselves to the naked eye. Many classifications of parts could be made, but the following table is perhaps as logical as any:

### 1. The Central Nervous System

A. The brain	cerebrum	r. hemisphere	frontal lobe	All divided into gyri by fissures or sulci
			parietal lobe	
	cerebellum	l. hemisphere	occipital lobe	
			temporal lobe	
	midbrain		limbic lobe	
	pons		(as above)	
	medulla oblongata			
		two lateral lobes (cerebellar hemisphere)		
		one central lobe (vermis)		

### B. The spinal cord

<sup>12</sup> From Peter Sandiford, *Educational Psychology*. New York: Longmans, Green & Co., 1929, p. 109.

## 2. The Peripheral Nervous System

A. Cerebrospinal nerves  $\left\{ \begin{array}{l} 12 \text{ cranial nerves} \\ 31 \text{ spinal nerves} \end{array} \right.$

B. The autonomic nervous system  $\left\{ \begin{array}{l} 2 \text{ gangliated cords or trunks} \\ \text{plexuses} \\ \text{nerves} \end{array} \right.$

The brain consists of those parts of the central nervous system (*the cerebrum, cerebellum, midbrain, pons, and medulla oblongata*) which are contained within the bony cavity of the skull. Continuous with it, and protected by the vertebrae of the spinal column, is the spinal cord (Fig. 5). Both

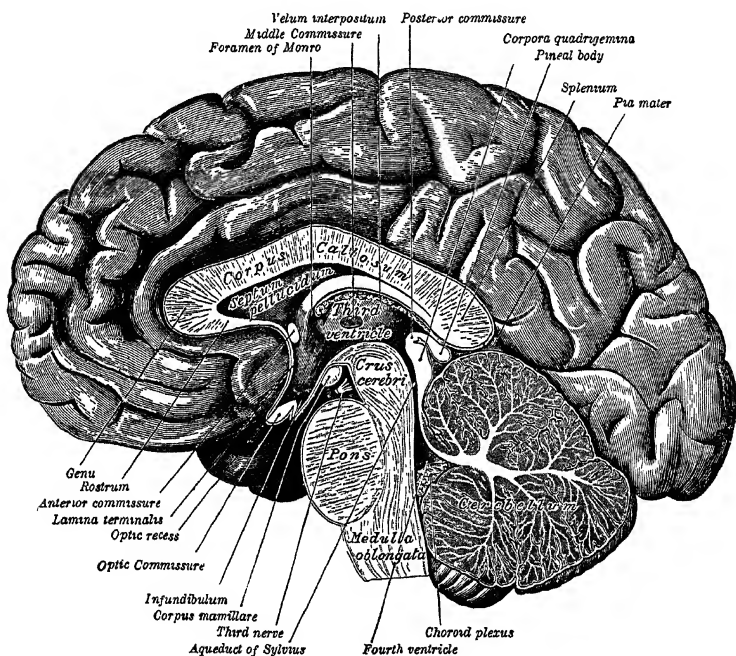


FIG. 6.—Mesial antero-posterior section of adult human brain.

brain and cord are surrounded by three membranes. These are the delicate *pia mater* immediately surrounding them; the *arachnoid membrane* which has the tenuity of a spider's web; and the thick fibrous *dura mater* which lines the bony cavity. Between the arachnoid membrane and pia mater is a space filled with cerebro-spinal fluid. The dura mater remains attached to the skull when the brain is removed from it.

3. THE NERVE IMPULSE<sup>13</sup>*C. J. Herrick*

It is now clear from experiments by Tashiro, Parker, Fenn, and others, that nerve fibers form no exception to the general rule that the energy of functional activity is derived from metabolism. During the transmission of a nervous impulse by a nerve fiber there is a measurable increase in consumption of oxygen and elimination of carbon dioxide. The proof that heat is generated by this oxidation during nervous conduction came more slowly, but this has now been supplied by Gerard. The amount of heat generated is very small, for a single impulse raises the temperature of the nerve hardly one ten-millionth of a degree and in a gram of nerve it releases only a millionth of a calorie of heat. As in muscle, the generation of heat by activity of the nerve is not instantaneous, but after a single nervous impulse it may continue for ten minutes. There is an initial phase lasting a few thousandths of a second, probably not much longer than the nerve impulse itself. The longer second phase, which is apparently a process of repair, yields nine-tenths of all the heat produced.

The belief that nerve fibers do not show fatigue has also been shown to be erroneous. After every pulse of nervous transmission there is a short phase of less than five thousandths of a second when the fiber is unexcitable—the absolutely refractory period. Then follows a relatively refractory period when the fiber can conduct nervous impulses, though it is less irritable and conducts more slowly than normally. These are periods of rest and recovery. In the short absolutely refractory period the nerve is utterly fatigued, then for about ten minutes it is recovering from fatigue. Rapidly repeated stimulation continued for a long time depresses the activity of the nerve fiber for a long period; this is an enduring fatigue of more grave significance.

The passage of a nervous impulse is not an electrical or any other elementary physical process, nor is it simply a wave of chemical change, like the burning of a fuse. It is a combination of biochemical, bio-electrical and other processes in very complicated relations, the details of which have not been fully determined, though the subject is now under active investigation. The nerve fiber is incapable of transmitting a steady continuous flow of nervous energy. In sustained activity there is a flow of successive impulses whose frequency is determined primarily by the refractory period of the fiber. Peripheral nerve fibers conduct according to an "all or nothing" law. A nerve fiber, under any given set of conditions, can carry only one strength of impulse, its maximum for those conditions, or none at all. This law is clearly established in peripheral nerve fibers; in the central nervous system the evidence is not so clear and in any case so many variable factors enter to change the conditions that the application of the law is obscured.

A nervous impulse is excited in a fiber by the application of some stimulus;

<sup>13</sup> From C. J. Herrick, *op. cit.*, pp. 111-113.

but the energy of transmission does not come from the stimulus; it is supplied by the fiber itself at each successive point passed by the nervous impulse. This impulse has been defined as "a propagated tendency to excite." During transmission the energy of the excitation seems to be derived from metabolism of the fiber and the agency of propagation is the change in electrical potential generated at the point of maximum activity.

In the unmyelinated nerves of vertebrates the nervous impulse travels at rates from 0.2 to 8 meters per second; in the myelinated sciatic nerve of the frog it varies from 24 to 38 meters per second; and in human myelinated nerves it may be as rapid as 120 meters per second. This rate varies greatly with different animals, with different nerves in the same animal, and in the same nerve under different physiological conditions.

#### 4. THE REFLEX CIRCUIT<sup>14</sup>

C. J. Herrick

Neurons can function only when they are connected in chains, so that the nervous impulse can be passed from one to the other. In any such chain the neuron first to be excited is called the neuron of the first order, and the succeeding members of the series, neurons of the second, third, fourth, and

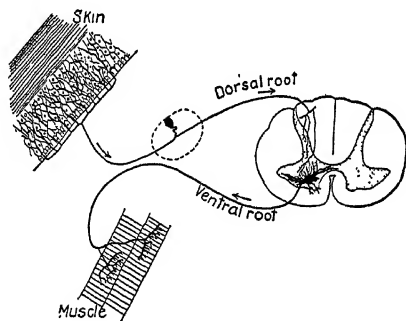


FIG. 7.—Diagram illustrating the simplest spinal reflex arc consisting of two nervous elements or neurons, a sensory neuron connected with the skin and a motor neuron connected with a muscle. Physiological connection between the two neurons is effected within the spinal cord. (Modified from Van Gehuchten from Herrick, *An Introduction to Neurology*. Courtesy of W. B. Saunders Company.)

so forth. All reflexes require an afferent neuron which conducts the nervous impulse from the receptor to the center, one or more efferent neurons conducting from the center to the organ of response, and usually one or more neurons intercalated between these within the center itself. Figure 7 illustrates the simplest possible connection of neurons in a reflex arc of the spinal cord involving only two elements. The afferent neuron sends its dendrite to the skin and its axon into the spinal cord, where the nervous impulse is taken

<sup>14</sup> From C. J. Herrick, *op. cit.*, pp. 49, 64, 72-73.

up by the dendrites of the efferent neuron, which in turn transmits it to a muscle.

A *reflex act*, as this term is usually defined by the physiologists, is an invariable, mechanically determined adaptive response to the stimulation of a sense organ, involving the use of a center with the appropriate receptor and effector apparatus. The act is not voluntarily performed, though one may become aware of the reaction during or after its performance. The nervous parts involved in this reaction comprise the reflex arc, or reflex circuit, which is a chain of neurons reaching from the sense organ to the center and from the center to the organ of response, together with more or less complicated connections in the adjusting center. The parts must be so connected that (in typical cases) upon stimulation of the receptive end organ a useful or adaptive response follows, such, for instance, as the immediate jerking away of the hand upon accidentally touching a hot stove.

It is evident that the "simple reflex" is a pure abstraction. Such a reaction never occurs in the intact living body, and there is no known nervous mechanism capable of executing such an isolated response. The reflex arcs are interrelated by an inconceivably complicated web of nervous cross connections, so that the simplest reflex movement requires the participation of many of them.

In view of the apparent inadequacy of the doctrine of reflexes to embrace all of human and other animal behavior and of the critical attitude toward this doctrine now so common, the most promising field of inquiry would seem to be the embryologic and phylogenetic development of behavior pattern together with a study of the bodily changes correlated with this growth in complexity of behavior. The most complete observations in this field are those of Coghill on the development of behavior patterns in salamanders.

The developing egg of a frog, salamander, or any other animal maintains a unity of structure, growth and behavior, and the preservation of this unity is the most essential requirement of successful living. At stages before nerves and muscles are differentiated the development is orderly and the unity of organization is maintained by various nonnervous agencies, such as the mechanics of surface tensions, the chemical interplay of elementary hormones, bio-electric tensions, physiological gradients. The neuromuscular apparatus develops within this unified system and its earliest configuration is evidently shaped by it. The earliest nervous reactions are integrated from the start; they are total responses of the organism as a whole. There are no separate reflexes: these come later.

## 5. DIFFERENCES BETWEEN NERVE-TRUNK AND REFLEX-ARC CONDUCTION<sup>15</sup>

C. S. Sherrington

Salient among the characteristic differences between conduction in nerve trunk and in reflex arcs, respectively, are the following:

<sup>15</sup> From C. S. Sherrington, *The Integrative Action of the Nervous System*. New Haven: Yale University Press, 1906, p. 14.

Conduction in reflex arcs exhibits (1) slower speed as measured by the latent period between application of stimuli and appearance of end effect, this difference being greater for weak stimuli than for strong; (2) less close correspondence between the moment of cessation of stimulus and the moment of cessation of end effect, i.e., there is a marked "after discharge"; (3) less close correspondence between rhythm of stimulus and rhythm of end effect; (4) less close correspondence between the grading of intensity of the stimulus and the grading of intensity of end effect; (5) considerable resistance to passage of a single nerve impulse, but a resistance easily forced by a succession of impulses (temporal summation); (6) irreversibility of direction instead of reversibility as in nerve trunks; (7) fatigability in contrast with the comparative unfatigability of nerve trunks; (8) much greater variability of the threshold value of stimulus than in nerve trunks; (9) refractory period, "bahnung," inhibition, and shock, in degrees unknown for nerve trunks; (10) much greater dependence on blood circulation, oxygen (Verworn, Winterstein, v. Baeyer, etc.); (11) much greater susceptibility to various drugs-anaesthetics.

These differences between neurons and reflex arc conduction are undoubtedly due to the passage of the nerve impulses over the synaptic functions between neurons. We now proceed to a consideration of the synapse.

## 6. THE SYNAPSE<sup>16</sup>

*W. M. Bayliss*

The anatomical unit of the higher central nervous systems is, as we have seen, the neuron. Perhaps the clearest proof of the *structural* discontinuity of the individual neurons is afforded by the fact that the degeneration which takes place in a nerve fiber, when it is cut off from the rest of its neuron, only proceeds as far as its contact (synapse) with the processes (dendrites) of another neuron. Although physiological continuity must exist, there is evidently an absence of protoplasmic or nutritive continuity. As Sherrington points out, such a contact surface is of great functional importance since "it might restrain diffusion, back up osmotic pressure, restrict the movement of ions, accumulate electric charges, support a double electric layer, alter in shape and surface tension with changes in difference of potential, with changes in surface tension or in shape, or intervene as a membrane between dilute solutions of electrolytes of different concentration or colloidal suspensions with different concentration of colloidal suspensions with different sign of charge." We have also manifold possibilities of excitation and inhibition in the use of one and the same neuron in different nervous acts and the consequent advantages to the organism in economy of machinery.

<sup>16</sup> From W. M. Bayliss, *Principles of General Physiology*. New York: Longmans, Green & Co., 1927, pp. 474-475.



Some points regarding the properties of the synaptic membrane have been already alluded to but may be recapitulated here.

Since there is no structural continuity, the possibility of actual retraction owing to increase of surface tension must be admitted.

The action of electrolytes, chloroform, and strychnine is, no doubt, exercised on the synaptic membrane, which, like other cell membranes, is presumably a colloidal system.

*The summation* of a series of ineffective stimuli, so that a reflex is ultimately produced, is a common property of nerve centers. Also "facilitation," as it is called by Sherrington, in which an effective stimulus leaves the mechanism for a time capable of excitation by stimuli which were previously too weak, seems to be a further aspect of the same phenomenon.

Adrian's work on the "*all or nothing*" principle has important consequences for the central nervous system, since it shows that a disturbance cannot be permanently altered in strength by passing through some region of decrement. We cannot assume that it can be made in this way too small to pass through the synapse, which must itself be looked upon as a place of decrement. This fact shows the importance of the actual connections of a particular neuron; in other words, the anatomy of tracts and the centers which they bring into relation with one another is of essential importance. At the same time, the effect of strychnine shows that, in the spinal cord, there is potential communication, at the least, between a receptor and all the motor neurons. A localized stimulus sets into activity the whole of the muscles of the body.

*Irreciprocal conduction.*—It seems to be a very usual property of the synaptic membrane to allow impulses to pass in one direction only. Thus Gotch and Horsley (1891) found that stimulation of the central end of an efferent root caused no electrical change in the spinal cord above, although that of an afferent root did so. On the other hand, the discharge of a spinal center flows, in part, backwards, down the other afferent, dorsal roots. Veszi (1909), by an ingenious form of experiment, has shown that continued stimulation of a motor nerve produces no fatigue in the reflex centers; the excitatory process does not spread inwards as far as the place where central fatigue occurs.

*Fatigue.*—[It has been shown] that a motor center may be fatigued for one reflex but remain unaffected for another. This state of fatigue is, accordingly, situated in some synapses, not in the efferent neuron itself. Excessive fatigue has been found to result in changes in the cell substance, as the experiments of Dolley, and of other observers, show.

## V. The Effectors

We must now consider the last segment in the action circuit—the effectors. The effectors are ordinarily subdivided into two classes: (1) the muscles and (2) the glands. Each of these two subdivisions may be in its turn subdivided into two categories, in such wise that we have the following schema:

## Muscles \*

- A. Striated (or voluntary)
- B. Smooth (nonstriated or involuntary)

## Glands

- A. Duct
- B. Ductless (or endocrine)

I. MUSCLES <sup>17</sup>

W. M. Bayliss

There are two kinds of muscular tissue, which, in the extreme of the scale, have very distinct properties, namely, the cross-striated, skeletal, or voluntary muscle on the one hand and the smooth, nonstriated, or involuntary muscle on the other hand. There are, however, many degrees of transition between them. The heart muscle of the vertebrate is cross-striated but exhibits many of the other properties of the other class; the claw muscle of the crayfish is another case.

Perhaps the most characteristic difference, physiologically, between the two classes is that the typical skeletal, cross-striated muscle, in its highest form of development, is entirely dependent upon impulses from the central nervous system to set it into activity; the other class possesses an automatic activity, manifested in tone, or in rhythmical contraction and relaxation, even when separated from the central nervous system. It is not to be supposed [however] that the involuntary muscle is not subject to control from the central nervous system.

Some other differences, rather of degree than of kind, may be mentioned. The rate of contraction of the smooth muscle is usually slow, compared with that of striated muscle; it has also a longer latent period. There are two properties deserving mention which both classes of muscle possess, although produced in a different way. The automatic *tone* of smooth muscle has been referred to above; skeletal muscle, under normal conditions also possesses a certain degree of tone, but it is of reflex origin from afferent nerves in the muscle itself and the joints, etc., ceasing when the nerves are cut. Again, smooth muscle is caused to enter into contraction by stretching. . . .

i. Distribution and Arrangement of Striped Muscle <sup>18</sup>

J. F. Dashiell

The striped muscles constitute from one-third to one-half of the total mass of the organism; there are over six hundred of them, all told. These are the active organs that are responsible for changes of positions of all bodily parts and members, from swinging of the leg in a long stride to the delicate adjusting of the eye for seeing a speck on the horizon or of the larynx for producing a certain musical note. Striped muscles are the tissues at work in eating, walking, listening, sewing, talking—in fact, in nearly all the activities of a person so far as they are externally observable.

\*In the interest of simplicity, we ignore such intermediate types of muscle tissue as the cardiac.

<sup>17</sup> From W. M. Bayliss, *op. cit.*, pp. 436-437.

<sup>18</sup> From J. F. Dashiell, *Fundamentals of Objective Psychology*. Boston: Houghton Mifflin Company, 1928, pp. 53-54.

Their function of moving a part of the body is typically performed by pulling on levers. The bony skeleton is an elaborate framework, consisting mainly of systems of levers upon which the body is hung and stretched; and it is by the manipulation of these levers that the body changes its positions and postures. . . .

An antagonistic arrangement of muscles is commonly found. In all, there are two hundred pairs of muscles in the body. By virtue of this disposition of most muscles into antagonistic groups, control over the bony levers or other movable parts is made more delicate. The biceps and triceps of the upper arm, tending respectively to flex and to extend the forearm, pull against each other in varying degrees of tension; and the direction and amount of excursion of the forearm depend upon the precise ratio between these two tensions—a gradation that can be got under very fine control. Similarly, the rolling of the eyeball from left to right as in reading, up and down as in adding sums, or with a rotary movement as in following the motion of a large wheel, is always a resultant of antagonistic pulls by three different pairs of muscles in the eye socket.

## ii. Distribution and Arrangement of Smooth Muscles<sup>19</sup>

*J. F. Dashiell*

Less directly involved in the behavior of man with reference to people and objects surrounding him, yet of first importance in the general economy of the living organism and hence indirectly significant in its outward conduct, are the smooth muscular tissues. They are found in the walls of the so-called hollow viscera of the body—such as the arteries and veins, the esophagus, stomach, and intestines, the passages and ducts of the genital and urinary organs, the bronchi, and ducts of certain glands, and also in the skin in connection with the hairs.

Generally speaking, these muscles are disposed in the hollow organs in two typical ways, longitudinal and circular. [The] contracting and relaxing [of the circular muscles] produce constriction and dilation of the blood vessel, thereby decreasing or increasing the “bore” of the blood vessel. This muscular control of the diameters of the different blood vessels in the whole body results in a control of the direction in which the excess supplies of blood are sent—to striped muscles and to lungs, to digestive apparatus, to sex apparatus, to brain, to skin, and so forth; and this phase has prime importance in the mechanics of the body machine.

The circular and longitudinal musculatures play co-operative roles in the process of peristalsis in the alimentary canal. Food must be moved along. While a horse is drinking, the peristaltic movement of its esophagus may be plainly seen along its neck. A half-inch or so of the longitudinal muscle contracts, pulling the next lower part of the canal up over a lump of the contents; the circular fibers next contract, squeezing the material a short way along the

<sup>19</sup> From J. F. Dashiell, *op. cit.*, pp. 62-64.

tube; then the fibers next below repeat the process; and thus the contents are forced in a wavelike motion. (It is interesting to note that the excitation of these muscle tissues producing peristaltic activity is in part *via* a "nerve net" type of tissue of a primitive form.) In the stomach section of the alimentary canal this activity is complicated by the addition of oblique muscles which help to churn the contents, and by sphincter muscles at the two ends, which shut off esophagus and intestine during the churning.

### iii. The Physiology of Muscle<sup>20</sup>

L. A. Crandall

*Muscular contraction and the all-or-none-law.*—When stimulated with a single induced shock, a muscle that has been removed from the body contracts and then relaxes. The muscle can be supported by a clamp with its free end attached to a lever that writes on smoked paper; a record obtained in this manner is illustrated in Figure 8. There is a brief pause, *the latent period*, between the stimulus and the beginning of the muscular contraction, and it will be noted that the process of relaxation requires slightly more time than does contraction. When the gastrocnemius muscle from a frog is employed, the

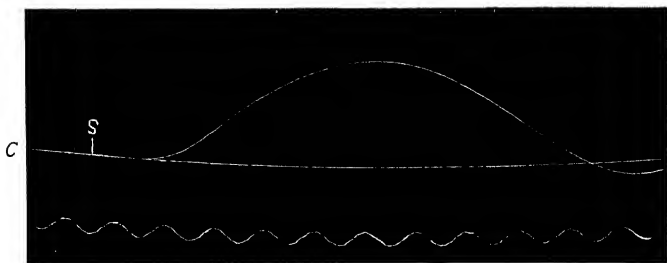


FIG. 8.—A record on smoked paper of a single contraction of striated muscle. The stimulus was given at S. Note the latent period before the muscle begins to contract. The lowest line indicates time intervals. (Howell, *Textbook of Physiology* Courtesy of W. B. Saunders Company.)

contraction lasts about 0.1 second. The duration of contraction in certain mammalian muscles is only 0.07, while the contraction of the muscle of an insect may be complete in 0.003 second.

In frog muscle the latent period usually amounts to about 0.01 second, the period of contraction 0.04 and the period of relaxation 0.05 second. In the case of muscles that have shorter duration of contraction these periods are correspondingly decreased. The time required for contraction is not the same in all muscles from the same animal; where rapid movement is advantageous, the duration is short, while in other cases the contraction is prolonged.

The strength of contraction varies with many factors such as the condi-

<sup>20</sup> From L. A. Crandall, *An Introduction to Human Physiology*. Courtesy of W. B. Saunders Company, 1935, pp. 221-222, 224-226.

tions of the muscle, the load which it must lift, its temperature, the strength of the stimulus that reaches it, and so on. A consideration of these factors, most of which have been elucidated by experiments upon isolated muscles, leads to a conception of how muscle behaves as a part of the body machinery. The strength of an electrical stimulus can be varied from that which is too weak to cause any appreciable response (subliminal stimulus) or will cause a barely perceptible contraction (minimal stimulus) to one that will produce the strongest contraction of which the muscle is capable (maximal stimulus). Stimuli between minimal and maximal are spoken as submaximal. If the strength of the stimulus is gradually increased from minimal to maximal, the corresponding contraction will show an increase in strength up to a certain point (maximal stimulus) beyond which stronger stimuli cannot bring about more forceful contraction. Stimuli much stronger than the maximal may even be followed by a decreasing strength of contraction, since the muscle may be injured. The above description applies to the behavior of muscle as a whole, but it has been shown that individual fibers obey the all-or-none law. . . . In case of striated muscle, a submaximal stimulus does not affect all of the fibers, and since only a part of them respond, the contraction is not all of which the muscle is capable. The muscle as a whole does not obey the all-or-none law, but each single muscle fiber contracts all that it can or does not contract at all. When we use our muscles we rarely call upon them for the greatest possible contraction; most voluntary contractions are submaximal, with only a portion of the fibers active. The ability of nerve impulses to bring about submaximal responses makes it possible to pick up an egg without breaking it or to throw a baseball with the desired speed.

*Warming up.*—When a muscle is repeatedly stimulated at intervals that are short enough so that recovery is not entirely complete, certain phenomena will appear; they are illustrated in Figure 9. It will be noted that the first few contractions increase in height; this is called the *treppe*, or the *staircase effect*. This period corresponds to the “warming up” period of an athlete. Muscular contraction produces lactic acid, carbon dioxide, and other by-products. The first effect of these metabolic by-products is to increase the irritability of the muscle; the influence of the first few contractions is beneficial. This is the explanation for the *treppe*. Following the *treppe* is a period during which the contractions are of equal height, then they begin to decrease in strength as evidenced by the decreased height, and finally relaxation becomes so slow that the lever does not reach the base line before the next stimulus arrives. When the contractions begin to decrease in height, fatigue is making its appearance. The failure of the muscle to relax completely is referred to as *contracture*; the appearance of this phenomenon is variable.

*Chemical changes during contraction.*—The sources of energy for muscular contraction are not well established. It is definitely known that the oxidation of dextrose, or of some compound of this substance, can serve as a source of energy, but whether other compounds such as fat can be used is debatable. There is some evidence that fat can be oxidized to provide the energy for

muscular contraction, but as yet we know nothing of the way in which this is brought about. But oxidative processes are not the immediate source of energy for the contraction, rather they supply the energy for the restoration of the chemical *status quo* after the muscle has contracted. Indeed, the shortening of

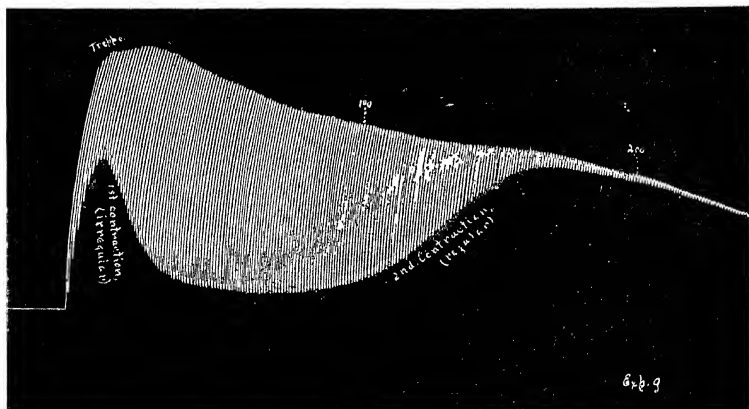


FIG. 9—Effect of repeated stimuli on a muscle. The muscle was stimulated at intervals of one second. Each vertical line represents a single contraction. (Howell, *Textbook of Physiology*. Courtesy of W. B. Saunders Company.)

striated muscle is too rapid a process to be brought about by energy derived from oxidation, which would almost certainly require more time than is consumed by the contraction. . . .

## 2. THE GLANDS

Glands are structures found in various parts of the body whose prime function is the formation and secretion of various fluids necessary to normal metabolism.

### i. The Duct Glands

Glands of this type are characterized structurally by the fact that their product is liberated by way of definite circumscribed channels which are known as ducts. The testes (in part), the liver, the pancreas (in part), are examples of the more important glands of this type. While the duct glands have a large role in the process of living organisms, they are not of immediate interest to the psychologist. We shall proceed, then, to a description of a few of the more important ductless glands.

### ii. The Ductless or Endocrine Glands<sup>21</sup>

L. A. Crandall

Certain organs in the body have the structure of glands but do not produce an external secretion as do the glandular structures thus far considered

<sup>21</sup> From L. A. Crandall, *op. cit.*, pp. 201, 205-206, 209-220, 214-218.

(stomach, salivary glands, etc.). Instead, the secretions manufactured by them are given off directly to the blood, so that they are carried to all parts of the body. These organs are referred to as the *glands of internal secretion*, the *ductless glands*, or the *endocrine glands*. The secretions that they elaborate are commonly called *hormones* or *autocoids*, although strictly speaking a hormone is one of two possible types of autocoids. Certain of the ductless gland secretions stimulate various body processes, others have an inhibitory action; the term "hormone" is properly reserved for the autocoids that have a stimulating

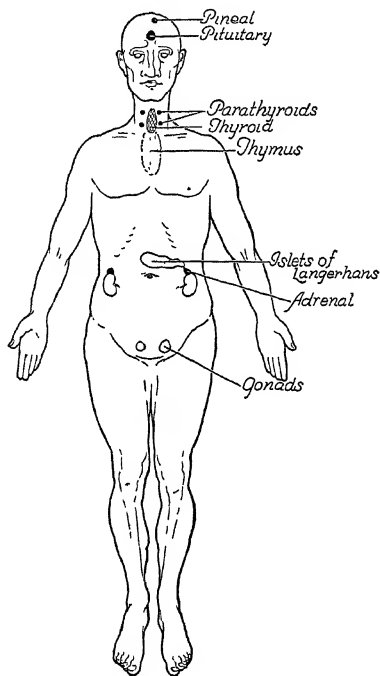


FIG. 10.—The location of some of the glands of internal secretion. (Williams, *Personal Hygiene Applied*. Courtesy of W. B. Saunders Company.)

effect, while those that inhibit are termed "chalones." The endocrine glands are not always separate structures as are the thyroid and pituitary; they may be combined with other tissues as in the pancreas where one type of cell (composing the islets of langerhans) produces an internal secretion (insulin) and the rest of the organ forms an external secretion (pancreatic juice). Some tissues that are not usually classed among the glands of internal secretion produce hormones; the intestinal mucosa, which forms cholecystokinin and secretin, is an example. A hormone may be defined as a substance that is produced in one organ and, on being carried by the blood stream to another,

excites functional activity in the latter. But this cannot be regarded as a strict definition since it would include carbon dioxide, which is produced by all tissues and excites functional activity in the respiratory center. The term "hormone" is restricted to specific substances, each produced by a particular gland. Some of the hormones, such as those from the thyroid and adrenal cortex, seem to be secreted continuously in relatively constant amounts, and the rate of secretion is not subject to abrupt change. In other cases (epinephrine from the adrenal medulla) the rate of secretion varies rapidly with the needs of the body.

*The thyroid gland.*—Extirpation of the thyroid gland in animals about a week after birth results in cessation of growth, and the animal becomes deformed, usually bowlegged, and the bones ossify earlier than is normal. This condition is known as *cretinism*. It occurs spontaneously in children wherever goiter is very prevalent, as is the case in many inland countries. The child does not grow normally, the skin becomes thick, the hair is loose and sparse, there is muscular weakness, the face appears bloated and large. Cretins show marked retardation in mental development and may lapse into imbecility.

*Myxedema* is the term applied to loss of thyroid function in the adult. It may appear spontaneously in the human or may follow operative removal of the thyroid gland. The object of the surgeon in removing thyroid tissue in cases of disease is to leave enough to maintain normal function while removing a sufficient amount to allay the hyperthyroidism; this cannot always be attained, and many prefer to remove too much rather than too little, since a deficiency can readily be supplied by oral administration of thyroid substance. The symptoms of myxedema are mental sluggishness, thickening of the skin, loss of hair, swollen and heavy features, and frequently a disappearance of menstruation in the female.

*The adrenal glands.*—These are paired glands located just above the kidneys; each gland contains two distinct types of tissues and is divided on this basis into *cortex* (outer part) and *medulla* (inner part). The evidence at present indicates that the function of these two parts of the adrenals are as distinct as the functions of separate glands. Removal of both adrenal glands results in death of the experimental animal in about five days (dog). Certain other species survive longer, but this is often due to the presence of accessory adrenal tissue which cannot be located and removed. In the dog the symptoms following adrenalectomy are muscular weakness, loss of appetite, hemorrhage in the gastrointestinal tract, a progressive fall of temperature, a decrease in the B. M. R., and a continuous decrease in the blood sugar level. There is evidence that all these changes must be attributed to the absence of the adrenal cortex. Animals with only the medulla removed appear quite normal under laboratory conditions, and an extract of cortex alone is able to restore adrenalectomized dogs to a normal state.

Although the effects of adrenal removal have been known for some time, only within the last few years have investigators in this field found a method of preparing extracts of the cortex that will prolong the lives of adrenalecto-



mized animals. This is already being put to clinical use; patients with Addison's disease have been much benefited by the administration of extracts of adrenal cortex. The active principle has been named *cortin*. It not only brings the blood sugar level, B. M. R., appetite and temperature of the adrenalectomized animal back to normal and abolishes the characteristic muscular weakness, but it also increases the ability of the normal animal to perform work and promotes the storage of glycogen. It will not increase the B. M. R. in a normal animal, but will do so after the metabolic rate has been decreased by thyroidectomy. Certain workers ascribe the beneficial effects of cortin to its action upon carbohydrate metabolism, and the symptoms that follow adrenalectomy to a breakdown of those metabolic processes.

*The pituitary gland.*—The *hypophysis*, or *pituitary gland*, is divided into two lobes, *anterior*, and *posterior*. The anterior lobe is composed of glandular tissue, the posterior of nerve tissue (therefore called also *pars nervosa*). Between the two is a small section termed the *pars intermedia*. The gland is connected to the base of the brain by a stalk (*infundibulum*). The infundibulum and a small area of the brain near its attachment are covered by a portion of the pituitary gland known as the *pars tuberalis*. The anterior lobe develops from the mucosa of the oral cavity in the fetus, while the posterior lobe is an outgrowth from the base of the brain; it might therefore be expected that the functions of the two lobes would be unrelated.

When the posterior lobe is separated from the rest of the gland and extracted, a material called *pituirrin* is obtained. Pituirrin will increase the blood pressure by constricting the capillaries, and cause the uterus to contract when injected subcutaneously or intravenously. It also has an antidiuretic effect, reducing the amount of urine secreted by a normal animal. In the condition known as *diabetes insipidus*, a disease of unknown cause characterized by the production of large quantities of dilute urine, the injection of pituitrin reduces the volume of the urine to normal. Whether a substance or substances possessing the properties of pituitrin are secreted into the blood stream is not known. Removal of the posterior lobe alone is not accompanied by any ill effects. Although pituitrin causes vigorous contractions of the pregnant uterus at term, and some have maintained that the contractions during delivery result from an increased secretion of pituitrin, we know that normal delivery can take place in the absence of the posterior lobe. Similarly, diabetes insipidus, which is controlled by pituitrin, cannot be produced experimentally by injury to the posterior lobe alone, but occurs when the hypothalamic region of the brain is irritated by injury. No thoroughly satisfactory evidence of the presence of pituitrin in the blood or cerebrospinal fluid has been presented. Much careful experimental study is needed to determine whether or not the posterior lobe actually forms an internal secretion; all that can be said at the present time is that this lobe is not essential to the normal state of the animal.

On the other hand, the anterior lobe is essential to normal growth and development. Hypophysectomy in young animals is followed by a cessation of growth, failure of the sex organs to develop, impairment of the thyroid and

adrenal cortex, and a reduction in the B. M. R. Frequent implantation of fresh sections of anterior lobe under the skin maintains the animal in a normal condition. Other effects following the extirpation of the pituitary gland have been reported, but it is extremely difficult to be sure that these are due to absence of the gland, because of the difficulty of removing the hypophysis without injury to the base of the brain. Trauma to the hypothalamic area of the brain near the pituitary gland has been followed by an excessive deposition of fat in some cases and by diabetes insipidus in others. It seems clear that the anterior lobe produces at least two hormones. The first has to do with growth and development and is called *phyone*. Absence of this hormone (hypophysectomy in immature animals) results in dwarfism. An excess of phyone can be introduced by an injection of extracts, or by subcutaneous implantation of anterior lobe, and produces gigantism. The second hormone controls the development of the ovaries; it is called *prolan* (or hebin). An excessive amount of prolan administered to young animals will bring about precocious maturity of the ovaries and uterus, while if it is lacking, these organs fail to develop.

During pregnancy large amounts of a substance similar to prolan are found in the urine. Properly made extracts of pregnancy urine are capable of producing precocious development of the genital tract in immature animals. Careful study has indicated that this substance is probably not prolan, but a similar material, the origin of which is unknown. Its presence has been made the basis of a test for pregnancy. Urine from a case of possible pregnancy is injected either into immature mice (Aschheim-Zondek test) or into virgin rabbits (Friedman-Schneider test). After a certain period an autopsy is performed and the condition of the ovaries indicates whether or not the prolan-like substance is present.

The diseases that occur in the human being which are supposed to be related to dysfunction of the pituitary gland are diabetes insipidus, Frohlich's syndrome (dystrophia Adiposogenitalis), gigantism, acromegaly, and dwarfism. The relation of diabetes insipidus to the pituitary gland is not clear. Frohlich's syndrome is a condition in which there is an excessive deposition of fat and a failure of the genitalia to develop; it may be the result of pituitary insufficiency. (See Fig. 11.) Gigantism and acromegaly are related conditions resulting from hyperactivity of the pituitary gland, particularly of those cells that secrete the growth hormone; in some cases the increased secretion results from a tumor originating in these cells. If the individual is young and the bones are still developing, gigantism will occur, but if the disturbed secretion begins after growth has stopped, acromegaly will be produced. In gigantism there is a relatively uniform overgrowth of all the bony structure, especially of the phalanges and of the mandible; in acromegaly the overgrowth is limited to the bones of the jaw and fingers, the jaw protrudes and the fingers are long and spatulate.

*The male gonads: the testes.*—These organs produce both an internal and external secretion; the former is formed by the interstitial cells, the later by spermatogenic tissue. It is possible to bring about degeneration of the sperma-

togenic tissue without interfering with the formation of the internal secretion; this can be accomplished by the action of X ray on the testicles, and also occurs in some cases where the testicles do not descend into the scrotum but remain in the abdominal cavity. In both cases the secondary sex characters develop normally and the sex urge is present, but the animal is sterile. If the testicles are removed in young animals, the bones do not cease to grow at the usual time and the animal is larger than the average of the species; there is a tendency to the deposition of large amounts of subcutaneous fat, the sex urge is absent, and the secondary sex characters (in the human: deep voice, typical

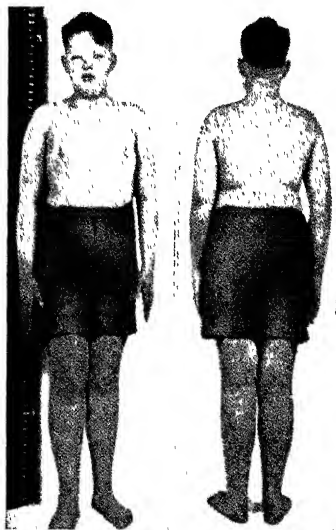


FIG. 11—Fröhlich's syndrome in a boy aged seventeen. Note the feminine distribution of subcutaneous fat. (Dr H. R. Rony, adapted from Crandall, *Human Physiology*. Courtesy of W. B. Saunders Company)

masculine distribution of hair, masculine body build) do not develop. The secretion of the interstitial cells is called the *male sex hormone*; it has been obtained in the pure state and when injected into castrated male animals brings about normal development. As noted above, a normal secretion from the anterior lobe of the pituitary gland is necessary for the development of the testes.

*The female gonads: the ovaries.*—The female sex glands produce at least two hormones. One is analogous to the male sex hormone; it brings about the development of the secondary sex characters, including that of the uterus, and is responsible for the sex urge. This hormone is called *theelin* or *oestrin* (other names are the lykinin, ovarin, folliculin, female sex hormone, ovarian hormone, etc.); it is probably produced in the developing follicle. Theelin will bring about the development of the uterus in immature animals. One of its functions

appears to be the promotion of the growth of the uterine mucosa during the first ten days after menstruation. The second hormone of the ovaries (*lutein, progesterin*) is formed by the corpus luteum of the ovaries. It carries the development of the uterine mucosa through the premenstrual stage and prepares that organ for menstruation; it is also necessary for the successful continuation of pregnancy during the first three months after conception; if removed during this period abortion occurs. It is further supposed to influence the development of the mammary glands during pregnancy.

At the time of puberty, follicles develop in the ovary under the influence of prolactin from the anterior lobe of the pituitary. Each follicle contains an ovum; they ripen, and at intervals of about one month one follicle ruptures, discharging the ovum into the Fallopian tube through which it passes to reach the uterus. The ruptured follicle becomes first a corpus hemorrhagicum, then a corpus luteum. If fertilization takes place, the corpus luteum persists through pregnancy. If the ovum is not fertilized, menstruation occurs and the corpus luteum is absorbed. The agent, presumably a hormone, that causes the corpus luteum to persist and thus prevents menstruation is supposed to come from the uterus or the developing embryo. It will be noted that uterine development is dependent upon ovarian hormones, while the development of the ovaries themselves is controlled by the pituitary gland. These complicated interrelationships have only been clarified within recent years, and a definite knowledge of many factors is still lacking. One obstacle to studies in this field has been the difference that exists between primates (man, apes, monkeys) and other animals with regard to the sexual cycle in the female.

## VI. Conclusion

After poring over material of the type that has been presented in the foregoing pages, students are likely to wonder whether it is relevant to the subject matter of psychology, since it seems to be, to all intents and purposes, nothing more than odd bits of information "lifted" bodily from the various biological sciences. This borrowing of facts from these older and better established disciplines is not, however, in the nature of mere "padding." It reflects the profound conviction of nearly all modern thinkers that the human organism is an integral part of the natural world. Hence it is impossible, from this point of view, that our motives, our dreams, our loves, our hates, our loyalties, and our perfidies can be understood without some knowledge of the biology of the organism. In fact, one might very well say that if we desired absolute control of our fellow men, we should not ask, like Mephistopheles, for absolute possession of their souls or their minds, but of their receptors, their nervous systems and their effectors. For it would seem that without these nothing "mental" can happen.

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## EXERCISES

1. What are the bearers of hereditary influences?
2. In what respect do these bearers differ in the human male and female?
3. Why is it impossible to look upon heredity and environment as mutually exclusive categories?
4. What are the elements contained in the action circuit?
5. Classify the receptors. What are their functions?
6. Name the various parts of the unit of structure of the nervous system.
7. Differentiate between smooth and skeletal muscles and indicate the general functions of each class.
8. In what sense may the endocrine glands be considered effectors?
9. What do you understand by the all-or-none law in muscles? How does this affect behavior?
10. Distinguish between the absolute and relative refractory period in nerve conduction.
11. Distinguish between the functions of the anterior and posterior lobes of the pituitary gland.
12. What is meant by the all-or-none law in nerve conduction?
13. How may a knowledge of the biological and physiological foundations of health and behavior help the principal, the classroom teacher, the school psychologist and the parent in dealing with problem cases? How may this knowledge be of help in understanding the growth processes?
14. What else is needed in growth and learning besides a good heredity and a healthy, normal body?

## CHAPTER III

### SOCIOLOGICAL FOUNDATIONS OF BEHAVIOR <sup>1</sup>

*J. B. Stroud, Kansas State Teachers College of Emporia*

#### I. Introduction

The purpose of this chapter is to orient the student of educational psychology to what may be called the cultural approach to the study of human behavior. Two radically different points of view have been entertained in sociology. The advocates of one position, the older of the two, have sought to explain the social order in terms of the essential nature of man while those of the other position have insisted that human nature is a product of the social order, that man's nature is derived from the social institutions under which he develops. The former is what is sometimes called the instinctive approach; the latter, the cultural approach. The cultural point of view has grown in importance within the last fifteen or twenty years until it may be regarded as the typical position today in sociology and anthropology.

For the educational psychologist and the student of education there is no more momentous problem than that raised here. No program of education can be satisfactory, except by chance, which is not based upon a true appreciation of the foundations of human nature, individual and social. Herein lies the definition of the task of education. If the educator accepts the instinctive point of view, his task becomes one of discovering man's original nature and of so fitting the social institutions to it that they will promote rather than hamper the unfolding of his biological tendencies. If, on the other hand, he accepts the cultural position, his task is to determine the most satisfactory kind of "human nature" and to bring to bear upon the members of society such educative influences as will produce this kind of nature.

The task of determining the most satisfactory kind of human nature which it is possible to promote is the work of the centuries. There is little doubt that the forces of education, taken collectively, have contributed very largely to the organization of human behavior as we understand it. We have seen ages of "visions," of "healing," of dueling, of witchcraft, of slavery, of soothsaying, of infanticide, of demons, of polygamous marriage, of patriarchal government, of extreme individualism, of collective bargaining, and of socialism—all of which have seemed perfectly *natural* to their adherents. These and hundreds of other practices have come and gone, the advocates of the cultural position tell us, without corresponding changes in the biological make-up of man. In this chapter excerpts have been taken from the writings of some of the leading authorities in the field of sociology and social

<sup>1</sup> The materials of this chapter are selected and organized to serve as supplementary reading for students of educational psychology. This chapter can be used in connection with the following texts: Powers and Uhl, *Psychological Principles of Education*, Chapter II; Gray, *Psychological Foundations of Education*, Chapter VIII; Davis, *Psychology of Learning*, Chapter II; Gates, *Psychology for Students of Education*, Chapter XIV; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter II; and Skinner and Collaborators, *Educational Psychology*, Chapter IX.

psychology with the thought that the educator more than almost anyone else should be interested in the sociological foundations of behavior.

## II. Human Nature

### I. HUMAN NATURE<sup>2</sup>

*E. T. Krueger and W. C. Reckless*

The important factor for the development of human nature is not so much what is *there* in the original equipment of man at birth but what is not there. For if man could not be vaccinated by social life, could not acquire ways of acting as a result of his social experience, he could not develop human nature. In other words, there is an unorganized element of man's original nature, a sort of structural plasticity enabling him to take on modes of behavior. And these modes of behavior are the results of training and experience. This unorganized part of man's native equipment, as distinguished from that part which is made up of relatively fixed modes of response such as reflexes, emotional reactions, temperament, intelligence, and special capacities, constitutes the foundation upon which human nature is built. It is the "potter's clay" which can be shaped into innumerable social molds.

Human nature, therefore, is not something that exists at birth. Neither is it a set of biological traits or tendencies which unfold and mature after birth. It is rather an acquired nature which represents the modeling of the plastic, unorganized part of man's native equipment. The modeling of this plastic original nature takes place in social experiences and results in the development of such forms of behavior which we may term social habits, attitudes, sentiments, self-control, and conscious purposes.

### 2. THE CULTURAL VERSUS THE BIOLOGICAL INTERPRETATION<sup>3</sup>

*Ruth Benedict*

I have spoken as if human temperament were fairly constant in the world, as if in every society a roughly similar distribution were potentially available: and as if the culture selected from these according to its traditional patterns had molded the vast majority of individuals into conformity. Trance experience, for example, according to this interpretation, is a potentiality of a certain number of individuals in any population. When it is honored and rewarded, a considerable proportion will achieve, or simulate it, but in our civilization when it is a blot on the family escutcheon the number will dwindle and those individuals be classified with the abnormal.

But there is also another possible interpretation. It has been vigorously contended that traits are not culturally selective but biologically transmitted.

<sup>2</sup> From E. T. Krueger and Walter C. Reckless, *Social Psychology*. New York: Longmans, Green & Co., 1931, pp. 27-28.

<sup>3</sup> From Ruth Benedict, *Patterns of Culture*. Boston: Houghton Mifflin Company, 1934, pp. 233-234.

According to this interpretation the distinction is racial, and the Plains Indians seek visions because this necessity is transmitted in the chromosomes of the race. Similarly, the Pueblo cultures pursue sobriety and moderation because such conduct is determined by their racial heredity. If the biological interpretation is true, it is not to history that we need to go to understand the behavior of groups, but to physiology. . . .

The physiological correlations that the biologist may provide in the future, however, so far as they concern hereditary transmission of traits, cannot, at their best, cover all the facts as we know them. The North American Indians are biologically of one race, yet they are not all Dionysian in cultural behavior. Zuni is an extreme example of diametrically opposed motivations, and this Apollonian culture is shared by the other Pueblos, one group of which, the Hopi, are of the Shoshonean subgroup, a group which is widely represented among Dionysian tribes and to which the Aztecs are said to be linguistically related. Another Pueblo group is the Tewa, closely related biologically and linguistically to the non-Pueblo Kiowa of the southern plains. Cultural configurations, therefore, are local and do not correlate with known relationships of the various groups. In the same way there is no biological unity in the western plain that sets these vision-seeking peoples off from other groups. The tribes who inhabit this region are drawn from the widespread Algonkian, Athabascan and Sionan families, and each still retains the speech of their particular stock. All of these stocks includes tribes who seek visions after the Plains fashion and tribes who do not. Only those who live within the geographical limits of the plains seek visions as an essential part of the equipment of every able-bodied man.

The environmental explanation is still more imperative, when instead of considering the distribution in space, we turn to distribution in time. The most radical changes in psychological behavior have taken place in groups whose biological constitution has not apparently altered. This can be abundantly illustrated from our own cultural background. European civilization was prone to mystic behavior, to epidemics of psychic phenomena, in the Middle Ages, as it was in the nineteenth century to the most hard-headed materialism. The culture has changed its bias without a corresponding change in the racial constitution of the group.

### 3. FOLKWAYS<sup>4</sup>

*W. G. Sumner*

They are like products of natural forces which men unconsciously set in operation, or they are like the instinctive ways of animals, which are developed out of experience, which reach a final form of maximum adaptation to an interest, which are handed down by tradition and admit of no exception or variation, yet change to meet new conditions, still within the same limited methods, and without rational reflection or purpose. From this it results that

<sup>4</sup>From W. G. Sumner, *Folkways*. Boston: Ginn and Company, 1906, pp 4, 28.



all the life of human beings, in all ages and stages of culture, is primarily controlled by a vast mass of folkways handed down from the earliest existence of the race, having the nature of the ways of other animals, only the topmost layers of which are subject to change and control, and have been somewhat modified by human philosophy, ethics, and religion, or by other acts of intelligent reflection. We are told of savages that "It is difficult to exhaust the customs and small ceremonial usages of a savage people. Custom regulates the whole of man's action—his bathing, washing, cutting his hair, eating, drinking, and fasting. From his cradle to his grave he is the slave of ancient usage. In his life there is nothing free, nothing original, nothing spontaneous, no progress towards a higher and better life, and no attempt to improve his condition, mentally, morally, or spiritually." All men act in this way with only a little wider margin of voluntary variation. . . . The folkways are the "right" ways to satisfy all interests, because they are traditional, and exist in fact. They extend over the whole of life. There is a right way to catch game, to win a wife, to make one's self appear, to cure disease, to honor ghosts, to treat comrades or strangers, to behave when a child is born, on the warpath, in council, and so on in all cases which can arise. The ways are defined on the negative side, that is, by taboos. The "right" way is the way which the ancestors used and which has been handed down. The tradition is its own warrant. . . . The notion of right is in the folkways. It is not outside of them, of independent origin, and brought to them to test them. In the folkways, whatever is, is right. This is because they are traditional, and therefore contain in themselves the authority of the ancestral ghosts.

### III. Social Isolation

#### I. DEFINITION OF TERM

The term "isolation" is used in sociology to denote an absence of social contacts. It signifies nonparticipation in a particular culture. There are, of course, degrees of isolation, as is implied in the attempts to measure social distance. The concept isolation is construed broadly so as to envisage social barriers of every sort. Lumley\* states that "It is an inclusive term for the many and varied ways in which social distance is increased by the interruption of or change in communicational devices; it includes the notion of 'exclusion from' as well as the 'absence of' contacts; it represents the greatest possible distance an individual can travel *away* from social unity."\* Some of the forms of isolation more commonly recognized are spatial (involving barriers, which may be overcome by transportation and communication), structural (those depending upon physical limitations including such sensory limitations as deafness and blindness, speech and motor defects, limitations in health, structure, and personal appearance), personal (including those individual characteristics, habits, traits, and the like which are nonacceptable to the social group), and psychic (including racial barriers, religious, political, economic, social, and cultural). Park and Burgess state that "variations in language, folk-

\* F. E. Lumley, *Principles of Sociology*. New York: McGraw-Hill Book Company, Inc., 1935, p. 62.

ways, mores, conventions, and ideals separate individuals and peoples from each other as widely as oceans and deserts." \*

## 2. THE POWER OF LANGUAGE<sup>5</sup>

*Helen Keller*

The most important day I remember in all my life is the one on which my teacher, Anne Mansfield Sullivan, came to me. I am filled with wonder when I consider the immeasurable contrast between the two lives which it connects. It was the third of March, 1887, three months before I was seven years old. . . .

Have you ever been at sea in a dense fog, when it seemed as if a tangible white darkness shut you in, and the great ship, tense and anxious, groped her way toward the shore with plummet and sounding-line, and you waited with beating heart for something to happen? I was like that ship before my education began, only I was without compass or sounding-line, and had no way of knowing how near the harbor was. . . .

The morning after my teacher came, she led me into her rooms and gave me a doll. . . . When I had played with it a little while, Miss Sullivan slowly spelled into my hand the word "d-o-l-l." I was at once interested in this finger play and tried to imitate it. When I finally succeeded in making the letters correctly I was flushed with childish pleasure and pride. . . . I did not know that I was spelling a word or even that words existed. . . . In the days that followed I learned to spell in this uncomprehending way a great many words, among them *pin*, *hat*, *cup*, and a few verbs like *sit*, *stand*, and *walk*. But my teacher had been with me several weeks before I understood that everything has a name. . . .

We walked down the path to the well house, attracted by the fragrance of the honeysuckle with which it was covered. Someone was drawing water and my teacher placed my hand under the spout. As the cool stream gushed over one hand she spelled into the other the word *water*, first slowly, then rapidly. I stood still, my whole attention fixed upon the motions of her fingers. Suddenly I felt a misty consciousness as of something forgotten—a thrill of returning thought; and somehow the mystery of language was revealed to me. I knew then that "w-a-t-e-r" meant the wonderful cool something that was flowing over my hand. That living word awakened my soul, gave it light, hope, joy, set it free! There were barriers still, it is true, but barriers that could in time be swept away.

I left the well house eager to learn. Everything had a name, and each name gave birth to a new thought. As we returned to the house every object which I touched seemed to quiver with life. That was because I saw everything with the strange, new sight that had come to me.

\* R. E. Park and E. W. Burgess, *Introduction to the Science of Sociology*. University of Chicago Press, 1921, p. 229.

<sup>5</sup> From *The Story of My Life*, by Helen Keller, copyright, 1903, 1931 by Doubleday, Doran and Company, Inc.

3. HOLLOW FOLK<sup>6</sup>

*M. Sherman and T. R. Henry*

Neither the recent World War nor the Civil War signified anything to any of the children. Although there were men of draft age in the community, they were so securely hidden in the depths of the Hollow that they were unregistered and scarcely knew that a war was in progress.

Naturally the fund of general information possessed by the Hollow folk is small. During the lifetime of a generation, up to a year ago, there had been little schooling. In Colvin Hollow proper there is not a single book, except in the schoolhouse. No newspaper is received regularly. Knowledge of current events is confined, at best, to strictly local happenings. . . .

In measuring the intelligence of the Hollow children any conclusions arrived at by their performance on any of the standard intelligence tests would be invalid, for purposes of comparison, unless given special interpretation. Some of these tests, for example, place considerable weight on the extent of an individual's vocabulary. But it would be absurd to expect these children to define words which, due to the very nature of their environment, they never could have heard.

The first tests given by the psychologists afforded grounds for such interesting speculations on the effect of environment on intelligence that they were followed by other measurements.

The tests showed, according to the scores, that these children were retarded mentally. They did almost as poorly on tests in which they had to work with their hands as on tests which involved only language. Curiously enough their intelligence defect increased with age. Mental growth seemed to become arrested at about the seven-year level. . . .

Below the seventh year the children differed from each other in the same way that normal children do. Some were bright, and others were dull. Above the seven-year level these differences largely disappeared. Children no longer were dull, bright and normal. They were all dull, according to the test scores. Their innate mental growth seems to slow up in the seventh year, whereas in the population at large it continues consistently until at least the sixteenth year. . . .

The responses of the Colvin Hollow children to quite elementary questions based on their own immediate environment do not indicate that they would pass such a test with a high score. They did not have specific names for the flowers which grew about the schoolhouse nor for the birds in the near-by bushes. . . . They were unable to identify several of the birds pointed out to them. A city child with kindergarten training probably knows more details of nature and nature's ways than these children of the hills. Their senses have not been trained for careful observation. Their future mental growth would be much simpler if they had learned to observe birds and flowers

<sup>6</sup> From M. Sherman and T. R. Henry, *Hollow Folk*. New York: Thomas Y. Crowell Company, 1933, pp. 122-123; 129-130.

carefully and to note signs of the passing seasons. One must know the relationship between objects before one can comprehend the symbols of objects.

#### 4. RACE PREJUDICE <sup>7</sup>

*W. I. Thomas*

The mechanics of modern culture is complicated. The individual has access to materials outside his group, from the world at large. His consciousness is built up not only by word of mouth but by the printed page. He may live as much in German books as in fireside conversation. Much more mail is handled every day in the New York post office than was sent out by all the thirteen states in a year at the close of the eighteenth century. But by reason of poverty, geographical isolation, caste feeling, or "pathos," individuals, communities, and races may be excluded from some of the stimulations and copies which enter into a high grade of mind. The savage, the Negro, the peasant, the slum-dwellers, and the white woman are notable sufferers by exclusion. . . .

For our purposes race prejudice may be regarded as a form of isolation. And in the case of the American Negro this situation is aggravated by the fact that the white man has developed a determination to keep him in isolation—"in his place." Now, when the isolation is willed, and has at the same time the emotional nature of a taboo, the handicap is very grave indeed. It is a fact that the most intelligent Negroes are usually half or more than half white, but it is still a subject for investigation whether this is due to mixed blood or to the fact that they have been more successful in violating the taboo.

### IV. Culture

#### I. THE CONCEPT OF CULTURE <sup>8</sup>

*F. E. Lumley*

In contrast to animal social life, man's social life continuously undergoes revolutionary changes. Why is this? Part of the answer is found in the *nature* of man and animals. Animals seem to *learn* very little. They do learn to some extent, as is shown by what has been accomplished in training dogs, horses, seals, and other creatures; experiments with lowly rats prove that they profit by experience. But here is the startling difference: what *animals* learn they seem *unable to impart* to others of their kind; trained chimpanzees, when released among their wild fellows, never try to bring these fellows up to their level but always revert to the level of living from which they were taken.

But what about *man*? We know that the reverse of this is true; we know that even among the most backward tribes of men the young are not left to learn all by themselves; we know that *inculcation* begins at birth; we know that the young are taught and thus saved many years of blundering trial and error. And, as man has learned more down through the centuries, he has taught

<sup>7</sup> From W. I. Thomas, "Race Psychology: Standpoint and Questionnaire, with Particular Reference to the Immigrant and Negro." *American Journal of Sociology*, 17, 1911-12, pp. 725-775.

<sup>8</sup> From F. E. Lumley, *op. cit.*, pp. 330-331.

more. Men profit by experience; then they teach; then they learn more; then they teach more; as they interact with each other, they learn more and teach more; then they change their forms of interaction and teach these new forms to the young, who interact more, learn more, change more—and so on without end. The distinguishing trait of man is not learning so much as *interlearning*—learning from each other and teaching each other.

Culture\* is transmitted socially, that is, by communication, and gradually embodies in a group tradition of which the vehicle is language. Thus culture in a group is a matter of habits of thought and action acquired or "learned" by interaction with other members of his group. Culture includes all of man's acquired power of control over nature and himself. It includes, therefore, on the one hand, the whole of man's material civilization, tools, weapons, clothing, shelter, machines, and even systems of industry; and, on the other hand, all of nonmaterial or spiritual civilization, such as language, literature, art, religion, ritual, morality, law, and government. The very mention of these indicates that man as a social creature is largely a cultural product.

## 2. CULTURE DEFINED<sup>9</sup>

*Knight Dunlap*

When we consider the ways of life of a group of people which has developed and maintained these modes over a considerable period of time, we speak of the *culture* of the people. This is a highly technical usage of the term "culture," carefully to be distinguished from the meaning of the term as used otherwise. In this technical sense, we include under the term "culture" the laws, conventions, and customs of the people; their forms of group organization, or institutions; their commercial, industrial and economic methods and procedures, in so far as these are standardized; their attitudes, in regard to morals; their language system; their philosophy, science and religion; and their common funds of folklore and literature. At different times we emphasize different aspects of this vague and complex mass, and seldom do we have a thoroughgoing comprehension of the total culture of any group. With regard to this sketchily conceived culture, we commonly divide the peoples of the world, present and past, into two groups; the *civilized* and the *uncivilized*. We have, apparently, some sort of abstract concept of something called "civilization," in which some peoples participate, and others do not.

## 3. CULTURE AND PARENTAL BEHAVIOR<sup>10</sup>

*Otto Klineberg*

In this chapter we shall consider those activities which were called "instinctive" by the older psychologists, and which have more recently been discussed under the name of "fundamental drives," "dependable motives," and similar

\* C. E. Ellwood, *Cultural Evolution*, p. 9.

<sup>9</sup> From Knight Dunlap, *Civilized Life*. Baltimore: The Williams & Wilkins Company, 1934, pp. 53-54.

<sup>10</sup> From Otto Klineberg, *Race Differences*. New York: Harper & Brothers, 1935, pp. 257-259.

descriptive phrases. They presumably make up the core of human nature, and give the dynamic basis to behavior. . . . The probability seems to be that many of these activities do have an innate basis; but, as we shall see, they vary tremendously according to the cultural setting in which they develop. . . .

One of the most important of these drives is the so-called maternal instinct, which is presumably responsible for the care and protection which a mother manifests toward her offspring. . . . The relation of parent to child differs greatly from one society to another. Rivers, for example, noted that in Murray Island in the Torres Straits it was very difficult to obtain genealogies from the natives because of the great prevalence of adoption. It is a common practice to adopt the child of another, sometimes even before the child is born. . . . Even after reaching adult life, the child will give the name of his adopted father. Of the Andaman Islanders, Man reports that it is of rare occurrence to find any child above the age of six or seven residing with its own parents, because it is considered a compliment and also a mark of friendship for a married man, after paying a visit, to ask his hosts to allow him to adopt one of their children. The foster parents treat their adopted children with exactly the same kindness and consideration as their own. . . .

It is also of interest to note that in ancient China the concept of maternity was radically distinct from every tie of blood. Family life was based upon the principle that there can be only one wife, and therefore only one mother. In consequence, all the children of the secondary wives were regarded as the sons of the principal wife, and to her alone they paid the respect due a mother; she received the title of mother, while the blood mothers were "aunts" to all the children alike. . . .

The Eskimo do not consider that white people deserve to have children since they are so heartless as to strike them; and in a New Guinea village the natives almost killed a White trader for beating his own child. These examples do not necessarily mean that among primitive peoples the parental attitude is more highly developed than in our society. There are other instances which appear to indicate just the opposite. Many peoples, for example, were in the habit of selling their children. The Botocudo in South America often were willing to sell their children to the Brazilians; in the Upper Congo children were surrendered in payment of a debt; among the Aztecs they were sold as slaves. Infanticide was also widespread. Among the Kuni in South Africa, it is said that there is not a woman who has not killed one or more children; this is the custom of their ancestors.

#### 4. DELINQUENCY AREAS<sup>11</sup>

*Clifford Shaw*

Behavior can be studied profitably in terms of the situation out of which it arises. In other words, behavior responses can be thought of as functions of situations. Analysis of individual factors is indispensable, but until the situa-

<sup>11</sup> From Clifford Shaw, *Delinquency Areas*. Chicago: The University of Chicago Press, 1929, pp. 1, 62, 198, 202-203.

tions in which individual's behavior has occurred are studied and analyzed, an understanding of his behavior must necessarily remain incomplete.

The cultural anthropologists have emphasized the importance of understanding the cultural background—the customs, codes, taboos, and traditions of a group—in the study of the behavior of any group. They have pointed out that many differences in behavior of peoples are based on differences in culture rather than on differences in biological inheritance. . . .

The average rate (of delinquents) is highest in the central zone, ranging from 20.9 in Zone I to 1.7 in Zone VII.\* The rates for the successive zones are: Zone I, 20.9; Zone II, 10.7; Zone III, 11.9; Zone IV, 8.1; Zone V, 5.6; Zone VI, 3.1; Zone VII, 1.7; Zone VIII, 2.1; Zone IX, 2.5. It is interesting that the variations in zone rates noted in this series (II) of alleged delinquents closely parallels that previously noted in the truant series (I).

The nine zones represent nine consecutive one-mile zones from the Loop in the city of Chicago. Zone I is nearest to the Loop. The 9,243 cases in this series (Series II) represent the boys dealt with by the juvenile probation officers in the year 1926. . . .

The first and perhaps the most striking finding of the study is that there are marked variations in the rate of school truants, juvenile delinquents, and adult criminals between areas in Chicago. Some areas are characterized by very high rates, while others show very low rates. . . .

A second major finding is that rates of truancy, delinquency, and adult crime tend to vary inversely in proportion to the distance from the center of the city. In general the nearer to the center of the city a given locality is, the higher will be its rate of delinquency and crime. . . .

A fourth finding of this study is that the differences in rates of truancy, delinquency, and crime reflect differences in community backgrounds. High rates occur in the areas which are characterized by physical deterioration, and declining populations. . . .

In this connection it is interesting to note that the main high rate areas of the city—those near the Loop, around the stock yards and the South Chicago steel mills—have been characterized by high rates over a long period. Our data are based on records that go back thirty years, and the early and late juvenile court series show conclusively that many of the areas have been characterized by high rates throughout the entire period.

## V. Interaction

### I. SOCIAL INTERACTION<sup>12</sup>

*Georg Simmel*

I start then from the broadest conception of society, the conception which so far as possible disregards the conflicts about definitions; that is, I think of

\*Rate refers to the "ratio of offenders to the total population of similar age (10 to 16) and sex (boys) of the different areas of the city."

<sup>12</sup> Translated from Georg Simmel, *Soziologie*, by A. W. Small, *American Journal of Sociology*, 15, 1909, pp. 289 ff.

society as existing wherever several individuals are in reciprocal relationship. This reciprocity arises always from specific impulses, or by virtue of specific purposes. Erotic, religious, or merely associative impulses, purposes of defense or of attack, of play as well as of gain, of aid and instruction, and countless others bring it to pass that men enter into ways of being-together-relationships of acting for, with, against one another, in a correlation of conditions; that is, men exercise an influence upon these conditions of association and are influenced by them. These reactions signify that out of the individual bearers of those occasioning impulses and purposes a unity, that is, a "society," comes into being. For unity in the empirical sense is nothing other than reciprocity of elements. An organic body is a unity because its organs are in a relationship of more intimate interchange of their energies than with any external being. A *state* is *one* because between its citizens the corresponding relationship of reciprocal influences exists. We could indeed not call the world *one* if each of its parts did not somehow influence every other, if anywhere the reciprocity of the influences, however mediated, were cut off. That unity, or socialization, may, according to the kind and degree of reciprocity, have very different gradations, from the ephemeral combination for a promenade to the family; from all relationships "at will" to membership in a state; from the temporary aggregation of the guests in a hotel to the intimate band of a medieval guild. Everything now which is present in the individuals—the immediate concrete locations of all historical actuality—in the nature of impulse, interest, purpose, inclination, psychical adaptability, and movement of such sort that thereupon or therefrom occurs influence upon others, or the reception of influence from them—all this I designate as the content or the material, so to speak, of socialization. In and of themselves, these materials with which life is filled, these motivations which impel it, are not social in their nature. Neither hunger nor love, neither labor nor religiosity, neither the technique nor the functions and results of intelligence, as they are given immediately and in their strict sense, signify socialization. On the contrary, they constitute it only when they shape the isolated side-by-sideness of the individuals into definite forms of with-and-for-one-another, which belong under the general concept reciprocity.

## 2. THE PRINCIPLE OF GROUP PRIORITY<sup>13</sup>

*E. S. Bogardus*

The concept of group priority arises out of a comparative study of the concrete facts regarding the individual and the group. At birth the human infant is an inchoate mass of impulses, reflexes, and potential responses to simple stimuli. He is physically, psychically, and socially helpless, and without social aid could not survive more than a few days. His life is maintained only between narrow temperature limits, and only when nourished by the

<sup>13</sup> From E. S. Bogardus, "The Principle of Group Priority," *Journal of Applied Sociology*, 7, 1922, pp. 84 ff.



simplest foods. Not being able to creep or walk, to talk, or to care for himself, he is the classical illustration of helplessness. As an individual organism, however, he is several months old at birth, and hence when considered as a prenatal being, his helplessness reaches the lowest thinkable level. By contrast, let us look at the ordinary group *milieu* into which he is brought at birth. There is his parental group, with its established language, its developed beliefs, and ironclad rules of conduct, its religious traditions and convictions. These all-powerful parental forces are made up out of neighborhood, national, racial, and cultural heritages millenniums old. They are often permeated by titanic superstitions, and by interpretations of life that have been passed from generation to generation and possess all the force of ages. Compare the hoary age and the tremendous power of these forces with the weak naïveté of the newborn babe.

Assuming that the infant could by some means or other succeed in living outside of groups, how far would he develop mentally, socially, and personally under nongroup conditions? Suppose that from birth he could live as it is alleged that Casper Hauser lived, namely, by himself, with food being left for him by someone whom he never saw and with whom he did not communicate in any way. What would this individual, growing up remote from group life, resemble at the age of twenty or forty years? What language would he speak? Would he have learned to cook food? In what kind of a house would he live? What kind of thoughts would he think, about what, for instance?

Through groups, languages, beliefs, inventions of all sorts, civilization has been transmitted from generation to generation, and now and then added unto and expanded. Take away the medium of group transmission, and the infant of today would have to begin in a far more simple, cruder way than the Neanderthal man began. Without the priority that is represented in group transmission of civilization, the modern infant would be helpless before animal life of all forms, even those on insect levels. Without the power that group transmission of ideas represents to buoy him up on the strong wings of civilization, he, or even the most mature of us, would not have a chance of surviving long under the engulfing primitive conditions which would be operating.

### 3. PSYCHOLOGY OF SOCIAL INSTITUTIONS<sup>14</sup>

*Charles H. Judd*

The concept of imitation . . . and the concept of suggestion . . . are mere names for the fact that individuals are in some way affected by their fellow beings. Both imitation and suggestion are wholly inadequate as principles for the explanation of modern civilization, and there can be no satisfactory social psychology which does not make clear the method by which human minds

<sup>14</sup> From Charles H. Judd, "The Psychology of Social Institutions." *Journal of Abnormal and Social Psychology*, 20, 1925, pp. 151-154.

have produced through co-operation the institutions which are collectively called civilization. . . .

It is the thesis of this paper that the required reform of social psychology can be effected through the consideration of social institutions. Language and literature, money and economic values, government and social conventions are facts in the world just as truly as are trees and mountains and climate. These social institutions are objective in the sense that they exist outside of individuals. They are no less objective than the facts of physical nature. While social institutions have extraindividual and superindividual reality, they owe their origin, as contrasted with the realities of the physical world, to the action of minds. Language, for example, is the product of co-operative effort on the part of intelligent beings. Government is a creation of men living in groups. Money is a material device evolved through long periods of racial experience and now so influential in controlling conduct that one sometimes forgets that money is a human invention and regards it as a thing.

These social creations epitomize in their present forms all the intelligence which has entered into the social evolution which brought them forth. Language is the crystallized result of the discriminative thinking through which the race has passed. Each new member of the race who is born into civilized society finds language present in a highly perfected form ready to influence and guide his behavior just as he finds paved highways and climate present to his senses and influential in directing his life.

. . . One does not need to resort to any vague concepts like imitation and suggestion when one recognizes the fact that tools and language and social conventions are the influences which surround the individual who lives in a civilized community. . . . Let us follow for purposes of illustration one concrete case. Civilized men have learned to be punctual. Think of the extent to which each one of us is dependent on the devices by which time is measured and by means of which engagements are prearranged for definite points in the future. . . . So accustomed are we to the practice and idea of punctuality that it is difficult for us to realize that punctuality and the precise measurement of time are not natural to the untrained individual. Primitive man is controlled in his behavior by certain gross happenings, such as sunrise and sunset, by winter and summer, but it required long periods of social evolution before the sundial or the water clock or the pendulum and spring came into existence. . . . Once clocks and the social recognition of punctuality were brought into the world, we find that individual behavior is guided into channels which it would not otherwise have followed. There are cultivated in every social community habits of regularity on the part of the members of the community which are emphatically not instinctive or inherited. . . .

Innumerable examples might be added to this which has been described. Consider the institution of weights and measures . . . or think of such a custom as passing on the right. There is no reason except convention why we should pass on the right. . . . The essence of social existence is not to be found in the instincts of isolated individuals but in those accumulations

of intellectual capital which make it impossible for the individual to live except as he becomes a part of the co-operating group which has brought this intellectual capital into being and is now devoting a vast amount of its energy to solidifying its holdings. If there is any order of importance in the world, the social group with its possessions must surely be thought of as enormously more significant than the individual; and social behavior and social institutions must be recognized as more permanent than any individual traits.

#### 4. THE INDIVIDUAL AND THE COMMUNITY<sup>15</sup>

*M. W. Roper*

The simple rural neighborhood has a homogeneous culture and a common heritage of folkways and mores which are the sole sources of social control, all the members habitually obeying one set of definitions. Under these conditions the neighborhood is not segregated into racial, cultural, or economic groups. The members are held together by common interests, friendships, kinship ties, attachment to locality, by sharing, by giving mutual aid and sympathy during group and family crises. . . .

The urban neighborhood is vastly different. Families live in close proximity but with little in common. Families may be living side by side or in the same apartment building, who are divided by race, by culture, or by economic interests. . . . Where the rural area has folkways and mores, the city has style and fashion setting the pattern for group behavior. Where the country is personal in its contacts the city is impersonal. In the city one does not call upon one's neighbors simply because they live near, nor does one aid in sickness and distress except in emergency cases. . . .

The impersonal relations in the city are likely to give the impression that city folk are brusque, cold, and unsympathetic. This is perhaps because their sympathy is expressed differently than where personal relations are in ascendancy. The city man may give liberally in support of a "cause," whereas, to a beggar on the street he may turn a "cold shoulder." . . .

In a previous chapter of this study we showed that the city may be divided, by a series of concentric circles, into five zones. Life in these zones produces various types of personality. The area in transition is the habitat of the hobo, the bohemian, and the rooming house type. Each of these types is characterized by extreme individualism and freedom, freedom from the folkways and mores of the primary group. Here also we find the various criminal types, the prostitutes, the ne'er-do-wells, and the first immigrant settlers, the latter possessing naïve rural habits and attitudes which unfit them for urban life.

In the third zone, that of working men's homes, we find the second immigrant settlement. They are better accommodated to life in the city than are those in the first settlement but still retain many of the old-world traits and characteristics. Their work, which is largely shop and factory occupations, sets

<sup>15</sup> From M. W. Roper, "The City and the Primary Group," Doctor's Dissertation, University of Chicago, 1935, pp. 40-41, 165, 167.

them apart from the neatly dressed "white collar" workers from other sections. The more thrifty and successful move on to the fourth or residential zone.

In the residential zone we find a more stable population than in the other zones discussed. The inhabitants are made up of the more economically successful individuals, largely American born. Here we find the apartment house, the apartment hotel, and the single family dwelling. In each of these types of dwellings we find a different type of urban personality.

## VI. Social Control

### I. THE CONCEPT OF SOCIAL CONTROL<sup>16</sup>

*R. E. Park and E. W. Burgess*

The selections on social control have been classified under three heads: (a) elementary forms of social control, (b) public opinion, and (c) institutions. This order of the readings indicates the development of control from its spontaneous forms in the crowd, in ceremony, prestige, and taboo; its more explicit expression in gossip, rumor, news, and public opinion; to its more formal organizations in law, dogma, and in religious and political institutions. Ceremonial, public opinion, and law are characteristic forms in which social life finds expression as well as a means by which the actions of the individual are co-ordinated and collective impulses are organized so that they issue in behavior. . . .

### 2. ELEMENTARY FORMS OF SOCIAL CONTROL<sup>17</sup>

*R. E. Park and E. W. Burgess*

Control in the crowd, where rapport is once established and every individual is immediately responsive to every other, is the most elementary form of control.

Something like this same direct and spontaneous response of the individual in the crowd to the crowd's dominant mood or impulse may be seen in the herd and the flock, the "animal crowd." . . .

Milling in the herd is a visible image of what goes on in subtler and less obvious ways in human societies. Alarms or discomforts frequently provoke social unrest. The very expression of this unrest tends to magnify it. The situation is a vicious circle. Every attempt to deal with it merely serves to aggravate it. Such a vicious circle we witnessed in our history from 1830 to 1861, when every attempt to deal with slavery served only to bring the inevitable conflict between the states nearer. Finally there transpired what had for twenty years been visibly preparing and the war broke. . . .

This is the most fundamental and elementary form of control. It is the control exercised by the mere play of elemental forces. These forces may, to

<sup>16</sup> From R. E. Park and E. W. Burgess, *Introduction to the Science of Sociology*. Chicago: The University of Chicago Press, 1921, pp. 787-788.

<sup>17</sup> From R. E. Park and E. W. Burgess, *op. cit.*, pp. 788-789.

a certain extent, be manipulated, as is true of other natural forces; but within certain limits, human nature being what it is, the issue is fatally determined, just as, given the circumstances and the nature of cattle, a stampede is inevitable. Historical crises are invariably created by processes which, looked at abstractly, are very much like milling in a herd. The vicious circle is the so-called "psychological factor" in financial depressions and panics and is, indeed, a factor in all collective action.

The effect of this circular form of interaction is to increase the tensions in the group and, by creating a state of expectancy, to mobilize its members for collective action. It is like the attention in the individual; it is the way in which the group prepares to act.

Back of every other form of control—ceremonial, public opinion, or law—there is always this interaction of the elementary social forces. What we ordinarily mean by social control, however, is the arbitrary intervention of some individual—official, functionary, or leader—in the social process. A policeman arrests a criminal, an attorney sways the jury with his eloquence, the judge passes sentence: these are the familiar formal acts in which social control manifests itself. What makes the control exercised in this way social, in the strict sense of that term, is the fact that these acts are supported by custom, law, and public opinion.

### 3. THE INSTRUMENTS OF CONTROL <sup>18</sup>

*E. A. Ross*

Although a rudimentary order may arise spontaneously, the farsighted members of the community perceive that a better order and a smoother teamwork may be had if only certain troublesome varieties of conduct can be suppressed while other helpful varieties are called forth. Often the means for such suppression lie at hand in the shape of central organs which may have been created for the purpose of military co-operation, but which can be used in instituting a regime of law. Then, too, religious ideas may be present which lend themselves to the construction of a system of control sanctioned by supernatural rewards and punishments.

Thus, in one way or another, society develops an apparatus of control designed to repress undesired conduct and to encourage desired conduct. How far this apparatus shall be elaborated and how much collective will shall be put behind it depend on the felt need of controlling the behavior of the individual. . . .

Some of the instruments society employs are directed upon the *will*; others are used to influence the *feelings*; while still others are addressed to the *judgment*. In the first group are *Social Suggestion*, *Custom* and *Education*, which use direct means to give the will a certain bent, and *Public Opinion*, *Law* and *Religious Belief*, which employ punishments and rewards. Among

<sup>18</sup> From E. A. Ross, *The Principles of Sociology*. New York: D. Appleton-Century Company, 1921, pp. 423; 429-430.

the instruments which appeal to the feelings are *Social Religion, Personal Ideals, Ceremony, Art, and Personality. Enlightenment, Illusion, and Social Valuation* are addressed to the judgment.

*Public Opinion* is the primitive nucleus out of which the various agencies of social control have developed. Out of the mobbing, whipping, and branding of the enraged public develop on the one side the measured and graduated physical penalties of *law and legal religion*; on the other, the delicate guidings of the individual by such refined means as *education, personal ideals, and social valuations*. All of these hit the mark better than public opinion, which reflects the stupidity and shortsightedness and impulsiveness of the mass. It strikes furiously at vivisection but is limp before bribery, adulteration, and monopoly. Its intensest reaction is against that which shocks its instincts, incest, for example, or infanticide, but just for that reason these offenses are the last to worry about. The thoughtful penalize speculation, ballot frauds and the neglect of fires in forests while the foolish public is gnashing its teeth at vaccinators and body snatchers. Unless it is directed by the wise or guided by accepted moral or legal principles, public opinion is a poor cuirass for protecting the vitals of society. Fortunately, law is a lamp to the public, teaching it to hate offenses like blackmail and intimidation of voters, which it does not resent from instinct.

The religious and legal codes are far more intelligent than public opinion. Religion mounts guard over the fundamentals which do not appeal immediately to the feelings of the public, such as chastity, marriage, filial obedience, and property. But, owing to the worshipper's indignation at any slight to his divinity, the religious code hits at many things which are not antisocial, e.g., swearing, Sabbath-breaking, and impiety.

#### 4. CEREMONIAL CONTROL<sup>19</sup>

*E. S. Bogardus*

Primitive man, modern fraternal organizations, churches, [and] governments all make a great deal of *ceremony* as a control. To a large degree it is a survival of autocracy. On it originally primitive leaders relied for prestige. Where a leader does not command respect or does not wield power delegated by the group members he must resort to force or fictitious prestige in order to maintain control. Ceremony as a tool of the autocratic leader puts the average individual into a more or less helpless situation. If he challenges the leader's ability to control, he is at once accused of taking the group's symbols in vain, and punished. . . .

Ceremony becomes enshrined in mystery and for this reason creates respect and awe. Autocracy deliberately manufactures ceremonial mystery to protect itself from attack or even from being openly questioned. This mystery baffles

<sup>19</sup> From E. S. Bogardus, *Fundamentals of Social Psychology*. New York: D. Appleton-Century Company, 1924, pp. 353-354.

the individual, making him even worshipful; it defies investigation and thus may hide a multitude of false controls.

Ceremony is inflexible and thus no matter how wisely planned fails to meet all of a person's needs. For the sake of the good, inadequate or repressive controls must also be accepted. Not being regularly subject to review and reform by legislative or judicial bodies ceremony easily becomes far more rigid than law. It is imbedded in the customs of primary groups and thus reaches individuals while they are yet young and becomes engrained in habit formations. Hence ceremony is doubly inflexible. . . .

Ceremony carries all the force of convention and ordinarily of custom. Further, it is usually personified in certain dignitaries who are masters of the occasion. It is the specific symbol of all that the group has fought for, and it carries the group haloes of the past. Hence, the force of ceremony is ordinarily irresistible when measured against the strength of a single individual.

## 5. PUBLIC OPINION AND THE MORES<sup>20</sup>

*R. E. Park*

We are interested in public opinion, I suppose, because public opinion is, in the long run, the sovereign power of the state. There is not now, and probably there never has been, a government that did not rest upon public opinion. The best evidence of this is the fact that all governments have invariably sought to *control* or, at least, to inspire and direct it.

The Kaiser had his "official" and his "semiofficial" organs. The communists in Russia have taken possession of the schools. It is in the school room that the bolshevists propose to complete the revolution. Hume, the English historian, who was the greatest of the English philosophers, said:

"As force is always on the side of the governed, the governors have nothing to support them but public opinion. It is therefore on opinion only that government is founded; and this maxim extends to the most despotic and the most military governments as well as the most free and popular. The sultan of Egypt, or the emperor of Rome, might drive their helpless subjects, like brute beasts, against their sentiments and inclinations, but he must at least have led his mamelukes, or praetorian bands, like men, by their opinions." . . .

We use the [term], "public opinion," in a wider and in a narrower sense. The public, the popular mind, is controlled by something more than opinion, or public opinion in the narrower sense. It is controlled, for example, by fashion and advertising.

We are living today under the subtle tyranny of the advertising man. He tells us what to wear, and makes us wear it. He tells us what to eat, and makes us eat it. We do not resent his tyranny. We do not feel it. We do what we are told; but we do it with the feeling that we are following our

<sup>20</sup> From R. E. Park, "The Crowd and the Public" (unpublished manuscript). Quoted from R. E. Park and E. W. Burgess, *op. cit.*, pp. 829-831.

own wild impulses. This does not mean that, under the inspiration of advertisements, we act irrationally. We have reasons; but they are sometimes afterthoughts. Or they are supplied by the advertiser.

Advertising, like propaganda, is a form of social control. The difference is that propaganda aims to form opinion. Advertising, on the other hand, does not, ordinarily, form opinions. It does not, at any rate, get its results by provoking discussion. Public opinion, on the contrary, is the product of discussion. Where there is no issue and no discussion there is no opinion, certainly no public opinion.

Fashion is one of the subtler forms of control to which we all bow. We all follow the fashion to a greater or less distance. . . . Fashion, in the broad sense, comes under the head of what Herbert Spencer called ceremonial government. Ceremony, he said, is the most primitive and the most effective of all forms of government.

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#### EXERCISES

1. What is meant by "culture" as the term is used in sociology and social psychology?
2. Discuss the concept of "group priority." State the alternative point of view.
3. What is meant by the instinctive approach to human behavior? Contrast this point of view as set forth by McDougall (*Social Psychology*) with the cultural approach.



4. Comment upon the educational significance of the cultural and the instinctive positions.

5. What is meant by the term "social institutions"? (V, 3) Give several examples of social institutions.

6. List and describe as many kinds of social isolation as you can. Comment upon the significance of social isolation in its relation to human behavior.

7. What methods of social control are used by classroom teachers? Which of these are especially effective and which are ineffective? Give reasons.

8. Would a larger repertoire of social instincts be a handicap or an advantage to man? Comment.

9. What is the meaning of "folkways"? Of "mores"? (II, 3) Comment upon their significance in human behavior.

10. What is your understanding of "social control"? List as many kinds of social control as you can.

11. Distinguish between "culture," as used by the sociologist, and "environment," as used by the psychologist. List some of the differences between the behavior of the city-dweller and that of the country-dweller.

12. Show how different cultural areas in a city may promote different behavior patterns. (IV, 4, and V, 4)

13. Comment upon the significance of "ceremony" as a factor in behavior.

14. How do you account for the vast differences in the behavior of Oriental and Occidental peoples?

15. What is your reaction to the statement that so-called racial differences in behavior, temperament, and the like, are really cultural rather than true racial differences?

16. It is said that the citizens of the Western world are today materialistic whereas those of the Middle Ages were as mystical as they could well be. How do you account for these differences?

17. It has been asserted that an American infant at birth has the capacity for adapting himself equally well to the culture of an Arab sheik, a cannibal, a Chinese coolie, a pagan, a Christian, a communist, or a capitalist. Comment.

## CHAPTER IV<sup>1</sup>

### GROWTH

*James L. Mursell, Teachers College, Columbia University*

#### I. General Nature of Mental Development

Growth and the ability to grow, as ends of educational endeavor, can be better comprehended when we understand the general nature of the growth processes. The selections in this chapter purport to help students do this, and they indicate that growth may be physical, intellectual, social-moral, aesthetic, emotional, religious, and so on. These readings, together with those in the two preceding chapters, provide the foundation for the directing of growth processes and learnings. When we think of learnings in terms of personality development or the realization of the aims of education, the term "growth" expresses the relationship most adequately. Hence, growth is promoted through the acquisition of skills and knowledges, the development of attitudes, appreciations, interests, and ideals, the development and control of emotions, expression and the creative urges, social functioning, and reflective thinking. Growth by physiological maturation is a natural process that must not be hurried. Growth by learning must take cognizance of the levels of maturation and intelligence, and such learnings must be so directed that the outcome will be power. The readings in Chapter XVI will elaborate this point in more detail.

#### I. BEHAVIOR OF THE NEWBORN CHILD<sup>2</sup>

*Florence L. Goodenough*

Helpless as the newborn baby seems, he is nevertheless able to perform a rather large number of complicated acts. He breathes, suckles, sneezes, coughs, and moves his whole body. He starts at a sudden noise, cries if he is hurt, turns his head freely from side to side when lying on his back, and if placed face downwards on a bed or table he promptly turns his head so as to free his nose for breathing, or he may lift his head clear of the table for an instant. If an object is placed in his hand, the fingers close about it,

<sup>1</sup> This chapter supplements the standard discussions found in textbooks such as Skinner and Collaborators, *Educational Psychology*, Chapter II, written by Dr. T. R. McConnell; Trow, *Educational Psychology*, Chapter XI; Jordan, *Educational Psychology*, Chapter XI; Sandiford, *Educational Psychology*, Chapters IV and VIII; Benson, *et al.*, *Psychology for Teachers*, Chapter V; Stroud, *Educational Psychology*, Chapter XI; Monroe, *et al.*, *Educational Psychology*, Chapter XI; Wheeler and Perkins, *Principles of Mental Development*, Chapters II, VI, VII, and XI; Hines, *Educational Psychology*, Chapter IX; Starch, *Educational Psychology*, Chapters VIII and XI; Pressey, *Psychology and the New Education*, Chapter II; Pintner, *Educational Psychology*, Chapters II, III and V; Hollingworth, *Educational Psychology*, Chapter VI; and Collings and Wilson, *Psychology for Teachers*, Chapter XX.

<sup>2</sup> From Florence L. Goodenough, *Developmental Psychology*. New York: D. Appleton-Century Company, 1934, pp. 130-134.

and so strong is this reflex grasp that many newborn infants can support their entire weight by their hands. . . . When at rest, the prenatal posture is usually maintained by most infants during the first three or four weeks.

At Ohio State University careful studies have been made of the amount and kind of activity shown by the newborn infant. . . . The results of these studies have shown that mass activity rather than independent movements of the separate parts of the body greatly predominated during the first ten days of life and that activity occurs even when all external conditions remain the same. . . .

In a further and more extensive study from the same laboratory, Pratt, Nelson and Sun reached the following important conclusion:

"The infant at birth represents an organism in which differentiation has proceeded to a point at which there are many effectors and many receptors. Its behavior, however, is generalized, that is, stimulation of almost any group of receptors by almost any kind of stimulus will lead to a response in any part of the organism. The reaction tends, however, to manifest itself most strongly in that part of the organism which is stimulated, and from there, spreads out with decreasing frequency and intensity to other segments of the body. This does not mean that the activity within any given segment is well co-ordinated." \*

Although mass movements predominate, local movements also occur more or less independently of the movements of the remainder of the body. In his early studies of infants Watson gave particular attention to these local or reflex movements. Of particular interest is his study of the so-called defense movements of the infant. If the nose is slightly pinched, the child's hands move upward and strike at the experimenter's fingers within a few seconds. If the inner surface of one knee is pinched, the opposite foot is brought up as if to kick the offender. Both these reactions were frequently observed during the first week of life.† A more recent study by the Shermans emphasizes the irregularity of these local responses immediately after birth and their rapid improvement thereafter, which is probably due in the main to recovery from the shock of birth.‡

## 2. CONDITIONING CANNOT EXPLAIN DEVELOPMENT<sup>3</sup>

Myrtle B. McGraw

The limitations of the conditioning theory . . . lie in the fact that it is constructed out of reaction patterns which are mature. Under such conditions growth would be a matter of associations or rearrangements of patterns

\* K. C. Pratt, A. K. Nelson, and K. H. Sun, "The Behavior of the Newborn Infant," *Ohio State University Studies, Contributions to Psychology*, No. 10, 1930.

† J. B. Watson, *Psychology from the Standpoint of a Behaviorist*. Philadelphia: J. B. Lippincott Company, 1919.

‡ M. Sherman and I. C. Sherman, "Sensory-motor Responses in Infants," *Journal of Comparative Psychology*, 5, 1925, pp. 53-61.

<sup>3</sup> From Myrtle B. McGraw, *Growth, A Study of Johnny and Jimmy*. New York: D. Appleton-Century Company, Inc., 1935, pp. 300-301.

already developed, whereas development really involves the *emergence* of something new—a way of behaving in which that particular individual has never behaved before. The ability to secrete saliva is a fully developed reaction pattern in the dog. By conditioning he learns to secrete saliva at the ringing of a bell as well as at the sight of food. One type of stimulus has been substituted for another, but the dog's manner of reaction is the same as it was before the conditioning.

The baby can be conditioned to cry at the sight of a rabbit, though it is presupposed that he had the ability to cry long before he saw the rabbit. Again, a newborn baby is equipped with a well-developed sucking mechanism. By ringing a buzzer every time a bottle is presented to the infant it is possible to condition him so that the mere ringing of the buzzer will set up the sucking response, though there is no nipple to suck on. So far as the infant's overt response is concerned, nothing new has been created in his behavior repertoire. But one could ring a buzzer a thousand times over simultaneously with the presentation of the bottle and yet not get a three- or four-months-old infant so *conditioned* that he would take the initiative of deliberately ringing the buzzer in order to have the bottle brought to him. The problem in development is to ascertain what has occurred to make it possible for the older child to take such initiative, whereas no amount of conditioning was sufficient to develop it in the growing baby.

When the inseminated egg begins to divide, it is behaving in a way that particular egg has never behaved before; and when the baby first pulls himself up and stands alone, he is behaving in a way that that particular baby has never behaved before. These changes in behavior are the phenomena characteristic of development.

The sort of development that means a mere *substitution* of stimulus or response is different from that type of growth which involves the creation or emergence of a new type of behavior; new, that is, in so far as the particular individual is concerned.

### 3. PRINCIPLES OF MENTAL DEVELOPMENT <sup>4</sup>

*Raymond H. Wheeler and Francis T. Perkins*

The outstanding problem in connection with the psychology of learning has always been, How are the successful responses selected? . . . The "selection of responses" takes place under the laws of dynamics, which have already been found to hold in the case of the developing organism. . . .

*The law of field properties.*—The problem of "selection" reduces to laws of organization the first of which is the law of field properties. From the goldfish to the ape a certain property of behavior was invariably demonstrated, namely, the property of insight. The solution of a given problem always turned out to be a *unit process*; it possessed an organization unat-

<sup>4</sup> Adapted from Raymond H. Wheeler and Francis T. Perkins, *Principles of Mental Development*. New York: Thomas Y. Crowell Company, 1932, pp. 107-117.

tributable to any single event into which the process could be analyzed, and this organization pertained not only to the space relations of the responses involved in the solution, but to their temporal relations as well. This fact held all the way from the original perception of the goal to the final mastery. Both organization and insight were characteristic of the total performance at any stage of its development. They are therefore field properties. . . .

These facts are profoundly significant for education. They mean that each step in learning is a total pattern of response, not reached by assimilating new elements into an old pattern, but by a totally new organization made in response to a stimulus pattern perceived as a whole in a new light. Tasks are learned as wholes. Unfortunately educational practice is generally based on the opposite assumption, that learning evolves piecemeal.

*The law of derived properties.*—The law of derived properties relates to “selection” in that no response will be made unless it fits the total pattern of behavior already formed with reference to a particular goal. . . .

These facts have their significance for education. They show, for example, the necessity of achieving tasks by the whole method in order that various parts of the task will take on the proper meaning. Parts derive meaning in no other way. Thus, in learning to read, sentences derive their meaning from the theme of a story; words derive their meaning from the complete thought of a sentence or phrase, and letters their meaning from words. Individual numbers acquire their mathematical values from ranges and series of numbers; a tone derives its perceived pitch value from acquaintance with a tonal range; individual colors from a color range. Size and position of objects are learned by first perceiving a spatial field.

*The law of determined action.*—This law states that the whole governs the activity of its parts and explains why parts take on derived properties. . . .

Applied to education this law demonstrates the inevitableness of defeat unless the whole method of learning is employed. Indeed it means that tasks will be mastered by wholes whether or not instructional techniques fitting such a method are employed, and that when not employed, any progress that is made comes about in spite of, not because of, the methods imposed upon the learner.

*The law of individuation.*—That parts emerge from wholes through a process of individuation is the fourth organismic law. The beginning stage of any growth process, whether it be the development of the nervous system, or whether it be a case of learning, is characterized by a lack of differentiation. This lack of differentiation reveals itself, in animal experiments, where the prescribed goal and the path to it have not yet definitely emerged. The final accomplishment is achieved when the total pattern has developed to the point where the goal, the path to it, and all the necessary movements have differentiated out together, each movement deriving, as it emerged, membership character in the total performance. . . .

Educational procedures that do not recognize this law are always ineffectual, for the reason that they do not permit the emergence of detailed

meanings on the one hand, and the more refined motor co-ordinations, on the other, in relationship to each other. As a consequence, learning is retarded and superficial. Much of the difficulty that pupils experience in school subjects is traceable to this source, especially the difficulties encountered in grammar, spelling, and mathematics.

*The law of field genesis.*—The law of field genesis is an important law of “selection” because, at any stage in the development of a given behavior pattern, any stimulus situation to which the organism will respond is relative to the status of the behavior pattern. That is, at any stage in the evolution of behavior with respect to a given problem, the stimulus pattern takes on more meaning, and will be responded to in such a way that more of the stimuli will be observed. To illustrate, when a novice looks for the first time into a microscope he fails to observe the fine shadings in color and distinctions in form of the tissue in the microscopic field. This does not mean that the light rays are not all being responded to, but that their total effect is at first undifferentiated. Later, the color field becomes differentiated, but it is the same general field as was perceived at the outset. . . .

The law of field genesis demonstrates the artificiality of piecemeal learning, and points to the importance of providing the learner, first, with a simple task which, instead of being repeated, should be expanded, gradually, in such a way that the unity of the task is preserved, a constant relation or principle brought out, and more and more detail admitted.

*The law of least action.*—The problem of “selection” can be understood best of all, perhaps, under least action. One set of movements in any problem situation is forsaken for another because the latter provide a shorter route to the goal. The shorter route means the expenditure of less time and energy. *No energy system needs to be taught this principle; it obeys the principle.* Inevitably, the animal or the human learner takes the shortest route to the goal which it is able to perceive under existing conditions. When it matures to the extent that it can discover a still shorter route, it will inevitably take it.

*The law of maximum work.*—The law of maximum work is, again, a law of “selection.” Those responses will be made which *best* relieve the organism’s tension toward a goal. This is because any form of stimulation disequilibrates the entire nervous system. That which disequilibrates it the most will dominate the response. Thus if the shortest known route through a maze brings the animal nearer the experimenter and the animal is more afraid of the experimenter than he is hungry, he will take a longer route, where available, in order to avoid the experimenter.

*The law of increasing energy.*—The law of maximum work explains why an animal or a human being achieves more when the goal is near than when it is far away. Recall again the behavior of a falling body. It is resolving potential energy in the course of approaching a remote end. The nearer it approaches the end, the greater becomes its kinetic energy or power to perform work. Similarly, the maximum energy available for human achieve-

ment increases with nearness to the goal. Human beings demonstrate this law each time they postpone an unpleasant task until the last minute *when it must be executed*.

*The law of configuration.*—The law of configuration, like all other organismic laws, is a law of "selection." It means first, that no response will be made unless in relation to the problem as a whole; second, that no movement will follow another in a sequence unless the meaning of the total performance, from beginning to end, is understood by the learner.

## II. The Relation between Learning and Growth

### I. RELATIVE INFLUENCE OF LEARNING AND MATURATION<sup>5</sup>

*Arnold Gesell and Helen Thompson*

The study deals with the developmental correspondence and acquired divergence of a pair of infant twin girls who were systematically studied from one month to eighteen months of age. . . .

Twin T was subjected to a program of daily training in climbing and in cube behavior\* for a period of six weeks beginning at the age of forty-six weeks. Twin C was reserved as a control and deprived of all specific training in these respects. . . .

Twin T's early reactions to training were relatively passive, and she needed assistance at one or all of the five treads. After four weeks of training (age fifty weeks), she climbed the staircase with avidity and without assistance. At fifty-two weeks she climbed the staircase in twenty-six seconds.

Twin C at the age of fifty-three weeks, without any preliminary training, climbed the same staircase unaided in forty-five seconds. After two weeks of training, at the age of fifty-five weeks, Twin C climbed the staircase in ten seconds.

The climbing performance of Twin C at fifty-five weeks was far superior to the climbing performance of Twin T at fifty-two weeks, even though Twin T had been trained seven weeks earlier and three times longer. The maturity advantage of three weeks of age must account for this superiority. . . .

Twin T was trained daily in cube behavior from forty-six to fifty-two weeks of age. A day-by-day analysis of this cube behavior showed a trend towards daily changes and increments of prehension, manipulation, and exploration. At the close of the training period, however, the cube behavior patterns of Twin C were highly similar to those of Twin T.

There is no conclusive evidence that practice and exercise even hasten the actual appearance of types of reaction like climbing and tower building. The time of appearance is fundamentally determined by the ripeness of the neural

<sup>5</sup> Selected and rearranged from Arnold Gesell and Helen Thompson, "Learning and Growth in Identical Infant Twins," *Genetic Psychology Monographs*, 6, 1, 1929, pp. 115-117.

\* Building towers, etc., with cube blocks. [Ed.]

structure. The effects of experience may well enter into the growth complex in the manner suggested by Coghill's studies of locomotion in amblystoma, but maturation plays the primary role and preserves the generic aspects of the behavior pattern. For all these reasons learning is profoundly conditioned by the factor of maturity. The infant grows rapidly. Although function enters into the growth, training does not transcend maturation. Maturation, however, constantly tends to supplant or modify the results of training. If it were not so, the infant could scarcely grow.

## 2. THE POSITIVE EFFECT OF TRAINING<sup>6</sup>

*Arthur T. Jersild*

In the above illustrations the child was encouraged to improve upon his performance of a single activity. It should therefore be pointed out that the meager effects of practice under such circumstances do not represent what may happen when training is designed to add to the child's repertory of skill and information rather than to improve upon a single performance. For example, if the children had come back day after day to learn the names of colors new to them (such as cerise, maroon, carmine, etc.) rather than to increase their rate of naming a particular group of colors, the results would no doubt have been much different. In the end, the children who were trained would, of course, have a larger color vocabulary than the control subjects who had never met these words. On the other hand, it is true that if the controls were given similar instruction when the others had finished they would undoubtedly learn the same words more rapidly than did their peers, since by this time they would be somewhat more mature. But in the immediate practical situation the learning which takes place through an extension of knowledge and skill is more important than the question of the child's potential ability.

Quite in contrast with the practice curves above are the results of a study in which the training was designed to widen the child's repertory of skill. Three-year-old children were given practice in singing, ten minutes at a time, twice each week, for a period of almost six months. The drill here was not meant to improve the child's speed, amplitude, or quality in singing a particular tone, but rather to encourage him to attempt new tones. Each note correctly sung added a tally to the child's score. At the end of the training, the practiced children had a large lead over similar control subjects. When re-tested again, several months later, the children who received training were still quite superior to the controls. At the end of training, the children sang an average of over fifteen separate notes; their parents, when tested, sang an average of less than twenty. The difference here between adults and children was small as contrasted with the difference between adults and children in the speed of color-naming, . . .

<sup>6</sup> From Arthur T. Jersild, *Child Psychology*. New York: Prentice-Hall, Inc., 1933, pp. 189-190.



3. MODIFIABILITY OF BEHAVIOR PATTERNS THROUGH TRAINING <sup>7</sup>*Myrtle B. McGraw*

We have seen that the effect a particular external factor or influence might have upon the growth of an organism or the growth of a behavior pattern is contingent upon the *time* at which the activating agent is introduced as well as the fact or nature of its introduction. In emphasizing critical periods of susceptibility to modification in the behavioral development of an individual we should avoid the implication that during the lifetime of an individual any one chronological period can be designated as the age when learning proceeds most easily and rapidly. It is not, in so far as this investigation can determine, the chronological age of the individual per se which denotes the "critical periods" of modifiability. It is instead the stage of plasticity or immaturity of the behavior pattern which determines the degree of susceptibility to alteration. Although too broad generalizations are at this time dangerous, it appears that if the external influence is brought to bear upon a behavior pattern or an aspect of a pattern at the time of inchoation, then the optimum effect upon the development of that particular pattern is effected. While there are opportune periods for influencing the growth of a behavior pattern through extrinsic factors, the permanence of the effect of repetition or restriction of an activity is dependent not only upon the time the experimental factor is introduced but also upon the duration of its influence. As long as an organism or a behavior pattern continues growing, so long does it have powers of restoration. Unless the period of deprivation has extended unduly, the restorative powers of the young child are enormous; hence the performances of a child whose activities have been restricted can at a later date, under the proper conditions, be brought to approximate the activities of the child whose opportunities for action have been stimulated. Since, however, the performances given the longest period of restriction were in the case of Jimmy the ones which were the most difficult to re-establish, there is reason to believe that if the period of deprivation had been continued sufficiently long powers of restoration as well as the performance per se would have suffered impairment. In the development of those behavior patterns where the gap between the inception of Johnny's practice period and the inception of Jimmy's exercise in the same activity was wide there occurred differences in the developmental phases of the pattern to a degree which was not apparent in the development of patterns wherein the boys had attained more comparable performance levels at the time practice was initiated.

<sup>7</sup> From Myrtle B. McGraw, *op. cit.*, pp. 259-260.

## III. Effect of Phyletic Status and of Age upon Abilities

I. LEARNING IN RATS, CHILDREN, AND ADULTS<sup>8</sup>

Florence L. Goodenough

A number of years ago Hicks and Carr\* undertook to find out how human beings of different ages would compare with rats in ability to learn a maze. They constructed two mazes of similar pattern, one of a size suitable for rats and another much larger one for humans. In all, twenty-three rats; five children, ranging in age from eight to thirteen years; and four university graduate students learned to run the maze. . . .

The rats made a great many more errors at the start than either the children or the adults. One reason for this is almost certainly to be found in the fact that they did not know in the beginning why they had been put into the maze nor what they were expected to do there. But the training was always done when the rats were hungry, and because they were hungry they were restless and active. They went exploring as rats will do at such times. They went in and out of the alleyways, doubling on their tracks many times and so piling up "error" scores. Finally by sheer blundering luck they chanced upon the food. The next time they were put into the maze the same sort of performance was gone through, but they did not repeat the same errors so many times, and on the average they reached the box a little more quickly. The third time they did still better and from then on they continued to improve until on the seventeenth trial the average number of errors had been reduced from fifty-three to one.

The children and the adults had the advantage over the rats [in] that they knew at the start what they were supposed to do and so, although there was nothing to guide them at first in choosing their pathways, they were at least trying to find their way out and so were less likely to wander aimlessly back and forth making the same errors over and over again. This was particularly true with the adults, who were inclined to go slowly and carefully and so made few errors. However, because of their slower movements, their saving in time was not as great as one might expect from an examination of the error scores alone. The children were more active and less cautious. If they were in doubt as to whether or not a certain opening led in the right direction, they did not waste time in thinking about it but dashed in to find out. So although they did not make as many errors in the beginning as the rats they made very many more than the adults. But after the first few trials the differences in the performances of the three groups became very small and by the end of the experiment there was little to choose between them.

The chief difference in the maze learning of school children and adults

<sup>8</sup> From Florence L. Goodenough, *Developmental Psychology*. New York: D. Appleton-Century Company, 1934, pp. 378-381.

\* V. C. Hicks and H. A. Carr, "Human Reactions in a Maze," *Journal of Animal Behavior*, 2, 1912, 98-125.

is not so much a question of their relative ability to learn as of their manner of attack upon the problem to be learned. The same difference appears in the learning of other motor skills. The child goes at the thing with more vigor. He makes more mistakes, but he will also get more practice in the same length of time. As compared to the child of preschool or kindergarten age, however, another difference can be seen. The school child has reached a level where he is willing, within limits, to keep on trying even under difficulties. He is less likely to give up as soon as the activity begins to lose interest. He can look ahead and think how much fun this thing will be after he has learned how to do it, and the prospect keeps him working long after the younger child would have given up in disgust. He will work at learning a maze for the fun of learning the trick of it, whereas the rat must be motivated by food and the younger child by some special device such as a bell that rings when the goal is reached. And there is another difference. The rat and the young child make the same mistakes again and again. They are lacking in self-criticism. They do not analyze their failures and their successes, and they do not profit very much by being told what is wrong with their methods. But the school child, although he is still inclined to rush ahead and try things out without giving very much thought to how he does it, nevertheless is beginning to pay more attention to method. He learns that there are right ways and wrong ways of doing things, and so he gains in skill not simply by reason of more practice but through practice of a better kind.

## 2. LEARNING CAPACITY AND AGE<sup>9</sup>

*Edward L. Thorndike*

The general fact that inner growth changes and increases the ability to learn is of obvious importance to our inquiry; and so is the approximate date of cessation of inner growth [with respect to] ability to learn. This latter probably varies for different abilities. Its general average or mode seems from our results to be somewhere near twenty, though psychologists in general would probably be inclined to set it somewhat earlier. Consequently we can assert with reasonable surety that the fact of inner growth favors adults in comparison with children. Unless it is counterbalanced by factors acting in the opposite direction, inner growth gives the person from twenty-five to forty-five as good an ability to learn as he had from twenty to twenty-five, a better ability than he had from fifteen to twenty, and a much better ability than he had from five to fifteen.

In general, nobody under forty-five should restrain himself from trying to learn anything because of a belief or fear that he is too old to be able to learn it. Nor should he use that fear as an excuse for not learning anything which he ought to learn. If he fails in learning it, inability due directly to age will very rarely, if ever, be the reason. The reason will commonly be one of

<sup>9</sup> From Edward L. Thorndike, Elsie O. Bregman, J. Warren Tilton, and Ella Woodyard, *Adult Learning*, 1928, pp. 129, 177, 181-182. By permission of The Macmillan Company.

these: He lacks and always has lacked the capacity to learn that particular thing. His desire to learn it is not strong enough to cause him to give proper attention to it. The ways and means which he adopts are inadequate, and would have been so at any age, to teach him that thing. He has habits or ideas or other tendencies which interfere with the new acquisition, and which he is unable or unwilling to alter. In the last case mere age may have some influence. A person's gait, posture, speech, and the like are acquired very early in life. They condition later acquisitions and they may to some extent impose inescapable limitations.

Freeman suggests that learning in early years is advantageous for the purpose of attaining the highest skill, and in cases where the learning consists in imitating another person. He writes:

"To attain the highest skill, one should begin early; but the child learns more slowly than the adult. Two forms of this question should be distinguished. We may ask first whether children can reach a higher degree of attainment than the adult; or whether a person can reach a higher attainment when he begins as a child than when he begins at a later age. . . . It will probably be conceded that in order to reach the highest degree of ability in motor skill, it is usually necessary to begin during childhood, though there are exceptions to this rule.

" . . . The child's plasticity is an advantage from the point of view of final attainment, and a disadvantage from the point of view of rapid progress. . . .

"The child's plasticity favors imitation as a method of learning. . . ."\*

These assertions are by no means certain. But even if they were, they would be rather feeble arguments for concentrating education in childhood; and Freeman probably would not intend them to be so used. The attainment of the highest motor skill requires not only an early start, but an enormous amount of practice, and is rarely an aim of education, perhaps for one person in a thousand. Learning by a diffuse childish activity out of which an imitation of a model somehow emerges is not an especially admirable kind of learning, nor on the whole so good as the deliberate planful imitation of an actor or gymnast or phonetician.

#### IV. Development of Special Functions

##### I. MOTOR DEVELOPMENT<sup>10</sup>

*John E. Anderson and Florence L. Goodenough*

If a newborn infant is placed in a room, one-half of which is darkened, the infant will turn toward the lighted half of the room. A few days later, eye co-ordinations appear. The infant follows the movement of objects before its eyes. On the average at fifty-eight days the infant will follow a horizontal movement, that is a movement across the field of vision. Movements up and

\* F. N. Freeman, *How Children Learn*, p. 149 f.

<sup>10</sup> From John E. Anderson and Florence L. Goodenough, *How Normal Children Grow*, 1930, pp. 6-9. Published by *The Parents' Magazine*, New York.

down will be followed on the average at sixty-five days, and circular movements on the average at seventy-eight days. Beginning the opposition of the thumb in grasping objects of moderately large size sometimes appears as early as the fourth month, but complete thumb opposition in grasping very small objects is usually not perfected before the tenth month. At about the age of one hundred and thirty-five days an infant will reach for and grasp an object held before it. It will take a second object at one hundred and sixty-five days, and will not take a third object, if it already has two objects in its hands, until some hundred days later, or at about two hundred and sixty days. These of course, are average figures from which considerable variation is to be expected in individual cases. It is interesting to note, however, that these simple responses put in their appearance at different times and run through a definite course of development.

The first major development of motor skill, the art of walking, puts in its appearance between the twelfth and fifteenth month as a rule, though in occasional children it may come as late as the eighteenth month or as early as the tenth month. The act of walking alone without support is only the final stage in a process which has been going on for a considerable period of time. . . . There seems to be wide variation in the methods developed by children for creeping or crawling in comparison with a smaller variation in manner of walking. . . . There is also considerable variation in the length of time children creep or crawl. Some children become so adept at creeping that actual walking seems to be delayed.

Another aspect of motor co-ordination about which there is much discussion is the development of right- and left-handedness. Unfortunately there are relatively few investigations which show the development of handedness in very young children. During the first two or three years of life, many children seem to use either hand with equal facility, even though a few cases show preference for the right hand. By the age of three or four years, increasing preference is commonly given to the right hand. By the age of six most children show definite right-handedness. From then on, the educational systems and the mechanical devices of modern civilization force upon the individual much practice with the right hand, and a strong tendency to use the right hand on every occasion is built up. Nevertheless, in spite of instruction and the fact that the world is built for right-handed people, a few children show definite preference for the left hand and continue to maintain left-handed tendencies as time passes. Many writers feel that if the left-handed tendency is so strong that it survives the early period of life, little or no attempt should be made thereafter to force the child to use the right hand.

The period from one year to five or six years in the normal child is marked by much motor activity. . . . Every encouragement should be given the child to use his muscles in such a way as to develop skills of various sorts.

It is virtually impossible to describe the subsequent development of motor abilities, since after the basic reactions are established, motor development takes place through the acquisition of special skills, rather than general skills.

2. THE DEVELOPMENT OF LANGUAGE<sup>11</sup>

Karl Bühler

The *immediate* source of language in the child, however, is not its cries, but its first *incoherent babbling*, an instinctive expression, definitely distinguishable from crying. . . .

. . . What is it that distinguishes childish babbling from crying? In the first place, its greater *diversity*. More important, however, is a second distinction. The various cries are built into an instinctive mechanism, which serves the natural purpose of drawing the attention of the nurse to the child's needs. But the first babbling sounds that the child produces remain for a considerable time free of any meaning. They represent, as it were, property that has no master, which anyone may claim, or in our sense, to *which any meaning may be assigned*.

. . . during the last quarter of the first year or a little later . . . the supremely important *first words which make sense are spoken by the child itself*. They are "babbled" words like *mamam*, *nana*, *dada*, etc., or reduplicated words like *dedda* for Bertha, *titt-titt* for tic-toc (clock), which the child tries to repeat after grown-ups. What is the meaning of these words? . . . *the first sensible words are either such affective expressions, or the signs of some wish*.

*The functions of indication and release\* are common to human language and the cries and calls of animals. . . . But human language has a third fundamental function, which has not as yet been demonstrated in any animal. I call this the representational function. . . .*

The first book of Genesis tells us how God brought all the animals in Paradise to Adam, who gave them each a name. The invention of names was, if not the first, certainly one of the most important steps in the history of the mental evolution of mankind. Every one of our children has to take it again. This usually happens at about the end of the first year, the beginning of the second year, or a little later. The first noteworthy phenomenon is that *the principle of the invariability of objects* establishes itself in the use of words, the second is the beginning of *questions as to names*, and the third a *sudden rapid increase of vocabulary*.

3. THE DEVELOPMENT OF DRAWING<sup>12</sup>

Karl Bühler

The first human figures (drawn by the child) are sketchy and incomplete, unorganized and without proportions. At any rate at this stage one can recognize outlines and above all a closed line for the head as well as the most important features. Out of the circle of the head other lines begin to grow, most frequently two straight lines downwards, which are obviously meant to

<sup>11</sup> Selected from Karl Bühler, *The Mental Development of the Child*. London: Kegan Paul, Trench, Trubner & Co., Ltd., 1930, pp. 52-57.

\* Affective expression and the sign of a wish. [Ed.]

<sup>12</sup> From Karl Bühler, *op. cit.*, adapted from pp. 109-120.

represent the legs. The arms are frequently missing, or come out of the head next to the legs. The torso and the neck are very badly treated. Later the torso becomes here a useful place "on which a head can be placed and from which limbs can be suspended." . . .

Why does the child draw such curious outlines of things? Surely it sees them differently, or, more correctly, its retinal images are quite different. The obvious answer, "because they are easiest to draw and are drawn by the adult like that for the child to copy" contains some truth, but it is inadequate. . . .

The root of the evil reaches far deeper into man's intellectual development. It is the fault of our *mastery of language*, which models the mind of man according to its requirements, and—do not let us be unjust—enables us by virtue of that mastery to rise to the highest achievements of thought. As soon as objects have received their names, the formation of concepts begins *and these take the place of concrete images*. Conceptual knowledge, which is formulated in language, dominates the memory of the child. What happens when we try to impress some event on our own memories? As a rule, the concrete images fade, but as far as the facts are capable of being expressed in language, we remember them. This development begins as early in the second year in the child, and when it begins to draw—in its third or fourth year—its memory is by no means a storehouse of separate pictures, but an encyclopaedia of knowledge. *The child draws from its knowledge, that is how its schematic drawings come about.* . . .

As a rule, the desire for graphic expression *fades at the level of the schema*, unless there be special talent or school training. About the age at which the child outgrows fairy tales it also gives up its spontaneous efforts at drawing. We can say that it discards schematic drawing just as it discards many other things of which later it almost seems to be ashamed, without being able to put something more mature into their place. The spontaneous beginnings of the art of drawing therefore atrophy quite soon, so completely, indeed, that if they were asked to draw a man or a horse, most members of the civilized nations of today would produce drawings hardly distinguishable from those of a child eight or ten years of age.

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## EXERCISES

1. Contrast in some detail the undifferentiated behavior of the newborn child with the differentiated behavior of the adult. To what extent is growth a process of differentiation?
2. What are some educational consequences of denying that growth can be explained by conditioning?
3. Indicate some changes in educational organization and teaching practice indicated by the various laws of development as formulated by Wheeler and Perkins.
4. With what conception of the processes of growth and learning is the law of derived properties sharply in contrast? Consider some practical educational consequences that would result from these opposing views.
5. Many common teaching procedures are known to bring about very disappointing results in the way of learning. Explain this with reference to the laws of mental development.
6. How do the laws of mental development as formulated by Wheeler and Perkins relate to the doctrine of selection by trial and error?
7. Education has been defined as "guided growth." What bearing has our knowledge of the influence of maturation upon the guidance of growth and so upon educational practice?
8. Distinguish as sharply as you can the parts played respectively by maturation and by learning in the growth process.
9. Are the relative effects of maturation and training the same for all behavior patterns?
10. What are the advantages and the disadvantages possessed by children as compared with adults when it is a question of learning a new behavior pattern?
11. Is anything to be gained by beginning to acquire such functions as motor skills, vernacular reading, or the mastery of a foreign language at a very early age? Is anything likely to be lost?
12. At any given chronological age are all behavior patterns equally ready to be affected by training? Indicate some important educational implications of your answer.
13. Discuss the relative influence of nature and nurture in producing right-handedness.
14. Show that the acquisition of language is a process of differentiation.
15. How does the developed artistic picture differ from the schematic drawing?



## CHAPTER V

### LEARNING: ASSOCIATION AND CONNECTIONISM<sup>1</sup>

*William Clark Trow, University of Michigan*

#### I. Introduction

More attention and space have been devoted to the subject of learning than to any other subdivision of the field of educational psychology. In a sense, all adjustments involve learning—good or bad, wholesome or otherwise, and so on. Education as a process implies that learning is constantly going on. Education as a product implies that learnings are retained and as such can be measured. The direction of the learning processes of children so that growth ensues is the chief business of the teacher in organized education.

The learning process may be analyzed into such general subdivisions as acquisition, retention, motivation, and transfer. The readings used in Chapters V and VI help to give us a clearer conception of the general nature of learning, the acquisition and retention processes, and motivation. In Chapter V Associationism and Connectionism are discussed in detail. As a beginning, learning and maturation are defined. The laws of association and their history are discussed in a manner that will acquaint the student with the background that led inevitably to the connectionism that is found in so much of the psychological literature of today. Connectionist principles and experiments and conditioning are treated at some length. In Chapter VI excerpts have been chosen which illuminate the theories and principles of learning. The Gestalt principles are passed in review and are followed by a summary statement of learning theories, the neurological foundations of learning, the testing of retention, a consideration of incentives, and habits. Acquisition, retention, and motivation are each treated in quotations drawn upon from the masters of yesterday and of today.

The acquisition of knowledge, skills, attitudes, social conduct, emotional control, creativity, and reflective thinking are discussed in subsequent chapters. Learning the school subjects is treated in Chapters XIV and XV; how learning in one situation influences learning in other situations (transfer) in Chapter XVI; the measurement and evaluation of learning outcomes (achievement) in Chapters XIX and XX.

#### II. Learning and Maturation Defined<sup>2</sup>

*Howard C. Warren*

*Learning.* 1. the process of acquiring the ability to respond adequately to a situation which may or may not have been previously encountered; 2. the

<sup>1</sup> Since every text in educational psychology treats of this subject, these readings can be used to supplement the relevant discussions in all of them. Griffith, *An Introduction to Educational Psychology*, Chapters V, XI, and XII; Skinner and Collaborators, *Educational Psychology*, Chapters VII and XII by Dr. Thomson and Dr. Davis; Trow, *Educational Psychology*, Chapter II; and Mursell, *Psychology of Secondary School Teaching*, Chapters II, III, IX, and XV.

<sup>2</sup> From Howard C. Warren, *Dictionary of Psychology*. Boston: Houghton Mifflin Company, 1934, pp. 150, 151, 160.

favorable modification of response tendencies consequent upon previous experience, particularly the building up of a new series of complexly co-ordinated motor responses; 3. the fixation of items in memory so that they can be recalled or recognized; 4. (Gestalt) the process of acquiring insight into a situation. (In general, (1) and (2) are applied to the acquiring of combinations of responses which enable the individual to cope more economically with a complex or variable situation; in these senses *learning* is a more inclusive term than *habit formation*. Progress in learning is measured in terms of efficiency, i.e., by some criterion of performance, such as speed, freedom from error, complexity of co-ordination, economy of effort, or perfection of form.)

*Maturation*. 1. (biol.) attainment of the state of complete development, or the process whereby this state is attained; applies to any organic growth, e.g., cells, organs, functions, organisms.

### III. The Laws of Association

#### 1. ARISTOTLE (384-322) <sup>8</sup>

Acts of recollection, as they occur in experience, are due to the fact that one movement has by nature another that succeeds it in regular order.

If this order be necessary, whenever a subject experiences the former of two movements thus connected, it will (invariably) experience the latter; if, however, the order be not necessary, but customary, only in the majority of cases will the subject experience the latter of the two movements. But it is a fact that there are some movements, by a single experience of which persons take the impress of custom more deeply than they do by experiencing others many times; hence upon seeing some things but once we remember them better than others which we may have seen frequently.

Whenever, therefore, we are recollecting, we are experiencing certain of the antecedent movements until finally we experience the one after which customarily comes that which we seek. This explains why we hunt up the series, having started in thought either from a present intuition or some other, and from something either *similar*, or *contrary*, to what we seek, or else from that which is *contiguous* with it. Such is the empirical ground of the process of recollection; for the mnemonic movements involved in these starting-points are in some cases identical, in others, again, simultaneous, with those of the idea we seek, while in others they comprise a portion of them, so that the remnant which one experienced after that portion (and which still requires to be excited in memory) is comparatively small.

Thus, then, it is that persons seek to recollect, and thus, too, it is that they recollect even without the effort of seeking to do so, viz., when the movement implied in recollection has supervened on some other which is its condition. For, as a rule, it is when antecedent movements of the classes here described

<sup>8</sup> From Aristotle, *The Parva Naturalia: De Memoria et Reminiscentia*. Edited by J. A. Smith and W. D. Ross. Oxford: Clarendon Press, 1908, pp. 451b-452a.

have first been excited, that the particular movement implied in recollection follows. . . .

But one must get hold of a starting-point. This explains why it is that persons are supposed to recollect sometimes by starting from mnemonic *loci*. The cause is that they pass swiftly in thought from one point to another, e.g., from milk to white, from white to mist, and thence to moist, from which one remembers Autumn (the "season of mists"), if this be the season he is trying to recollect. . . . The cause of one's sometimes recollecting and sometimes not, though starting from the same point, is that from the same starting-point a movement can be made in several directions. If, then, the mind has not moved in an old path, it tends to move to the more customary; for (the mind having, by chance or otherwise, *missed* moving in the "old" way) custom now assumes the role of Nature. Hence the rapidity with which we recollect what we frequently think about. For as regular sequence of events is in accordance with nature, so, too, regular sequence is observed (in consciousness), and here *frequency* tends to produce (the regularity of) nature.

## 2. THOMAS HOBBS (1588-1679) <sup>4</sup>

The *succession* of conceptions in the mind, series or consequence of one after another, may be *casual* and incoherent, as in dreams for the most part; and it may be *orderly*, as when the former thought introduceth the latter; and this is *discourse* of the mind. But because the word discourse is commonly taken for the *coherence* and consequence of words, I will, to avoid equivocation, call it *discursion*.

The *cause* of the *coherence* or consequence of one conception to another, is their first *coherence* or consequence at that *time* when they are produced by sense: as for example, from St. Andrew the mind runneth to St. Peter, because their names are read together; from St. Peter to a *stone*, for the same cause; from *stone* to *foundation*, because we see them together; and for the same cause, from foundation to *church*, and from church to *people*, and from *people* to *tumult*: and according to this example, the mind may run almost from anything to anything. But as in the *sense* the conception of cause and effect may succeed one another; so may they after sense in the *imagination*: and for the most part they do so; the *cause* whereof is the *appetite* of them, who, having a conception of the *end*, have next unto it a conception of the next *means* to that end: as, when a man, from a thought of *honour* to which he hath an appetite, cometh to the thought of *wisdom*, which is the next means thereunto; and from thence to the thought of *study*, which is the next means to wisdom.

<sup>4</sup> From Thomas Hobbes, *Humane Nature, or The Fundamental Elements of Politie. English Works*, edited by Sir William Molesworth. London: John Bohn, 1840, Vol. IV, Chapter IV, pp. 14-15.

3. JOHN LOCKE (1632-1704) <sup>5</sup>

*From a wrong connexion of ideas.*—Some of our ideas have a natural correspondence and connexion one with another: it is the office and excellency of our reason to trace these, and hold them together in that union and correspondence which is founded in their peculiar beings. Besides this, there is another connexion of ideas wholly owing to chance or custom: ideas, that in themselves are not all of kin, come to be so united in some men's minds, that it is very hard to separate them; they always keep in company, and the one no sooner at any time comes into the understanding, but its associate appears with it; and if they are more than two, which are thus united, the whole gang, always inseparable, show themselves together.

*This connexion how made.*—This strong combination of ideas, not allied by nature, the mind makes in itself either voluntarily or by chance; and hence it comes in different men to be very different, according to their different inclinations, education, interests, etc. . . .

*Some antipathies an effect of it.*—That there are such associations of them made by custom in the minds of most men, I think nobody will question, who has well considered himself or others; and to this, perhaps might be justly attributed most of the sympathies and antipathies observable in men, which work as strongly, and produce as regular effects as if they were natural, and are therefore called so, though they at first had no other original but the accidental connexion of two ideas, which either the strength of the impression, or future indulgence so united, that they always afterward kept company together in that man's mind, as if they were but one idea. . . .

I mention this not out of any great necessity there is in this present argument, to distinguish nicely between natural and acquired antipathies; but I take notice of it for another purpose, viz., that those who have children, or the charge of their education, would think it worth their while diligently to watch, and carefully to prevent the undue connexion of ideas in the minds of young people. This is the time most susceptible of lasting impressions; and though those relating to the health of the body are by discreet people minded and fenced against, yet I am apt to doubt, that those which relate more peculiarly to the mind, and terminate in the understanding or passions, have been much less heeded than the thing deserves: nay, those relating purely to the understanding, have, as I suspect, been by most men wholly overlooked.

*Instances.*—The ideas of goblins and sprites have really no more to do with darkness than light: yet let but a foolish maid inculcate these often on the mind of a child, and raise them there together, possibly he shall never be able to separate them again so long as he lives; but darkness shall forever afterward bring with it those frightful ideas, and they shall be so joined that he can no more bear the one than the other. . . .

<sup>5</sup> From John Locke, *An Essay Concerning Human Understanding*. Philadelphia: Troutman and Hayes, 1850, Bk. 2, Chapter XXXIII, pp. 261-263.

A man has suffered pain or sickness in any place; he saw his friend die in such a room; though these have in nature nothing to do one with another, yet when the idea of the place occurs to his mind, it brings (the impression being once made) that of the pain and displeasure with it; he confounds them in his mind, and can as little bear the one as the other. . . .

Many children imputing the pain they endured at school to their books they were corrected for, so join those ideas together, that a book becomes their aversion, and they are never reconciled to the study and use of them all their lives after: and thus reading becomes a torment to them, which otherwise possibly they might have made the greatest pleasure of their lives. . . .

#### 4. GEORGE BERKELEY (1685-1753) <sup>6</sup>

And, *first*, it is certain by experience, that when we look at a near object with both eyes, according as it approaches or recedes from us, we alter the disposition of our eyes, by lessening or widening the interval between the pupils. This disposition or turn of the eyes is attended with a sensation, which seems to me to be that which in this case brings the idea of greater or lesser distance into the mind.

Not that there is any natural or necessary connexion between the sensation we perceive by the turn of the eyes and greater or lesser distance. But—because the mind has, by constant experience, found the different sensations corresponding to the different dispositions of the eyes to be attended each with a different degree of distance in the object—there has grown an habitual or *customary connexion* between those two sorts of ideas; so that the mind no sooner perceives the sensation arising from the different turn it gives the eyes, in order to bring the pupils nearer or farther asunder, but it withal perceives the different idea of distance which was wont to be connected with that sensation. Just as, upon hearing a certain sound, the idea is immediately suggested to the understanding which custom had united with it. . . .

Nor doth it avail to say there is not any necessary connexion between confused vision and distance great or small. For I ask any man what necessary connexion he sees between the redness of a blush and shame? And yet no sooner shall he behold that colour to arise in the face of another but it brings into his mind the idea of that passion which hath been observed to accompany it.

#### 5. DAVID HARTLEY (1705-1757) <sup>7</sup>

Prop. X.—Any Sensations A, B, C, etc., by being associated with one another a sufficient Number of Times, get such a Power over the corresponding Ideas a, b, c, etc., that any one of the Sensations A, when impressed alone, shall be able to excite in the Mind, b, c, etc., the Ideas of the rest.

<sup>6</sup> From George Berkeley, *A New Theory of Vision*. Oxford: Clarendon Press, 1871, Vol. I, pp. 38-39.

<sup>7</sup> From David Hartley, *Observations on Man, His Frame, His Duty, and His Expectations*. London: Thomas Togg and Son, 1834, Chap. I, Sec. II, Prop. X, pp. 41-42.

*Sensations* may be said to be associated together, when their impressions are either made precisely at the same instant of time, or in the contiguous successive instants. We may therefore distinguish association into two sorts, the synchronous, and the successive. . . .

This proposition, or first and simplest case of association, is manifest from innumerable common observations. Thus, the names, smells, tastes, and tangible qualities of natural bodies suggest their visible appearances to the fancy, i.e., excite their visible ideas; and, *vice versa*, their visible appearances impressed on the eye raise up those powers of reconnoitring their names, smells, tastes, and tangible qualities, which may not improperly be called their ideas, as above noted; and in some cases raise up ideas, which may be compared with visible ones, in respect of vividness. All which is plainly owing to the association of the several sensible qualities of bodies with their names, and with each other. . . . Other instances of the power of association may be taken from compound visible and audible impressions. Thus the sight of part of a large building suggests the idea of the rest instantaneously; and the sound of the words which begin a familiar sentence, brings the remaining part to our memories in order, the association of the parts being synchronous in the first case, and successive in the last.

It is to be observed, that, in successive associations, the power of raising the ideas is only exerted according to the order in which the association is made. Thus, if the impressions A, B, C be always made in the order of the alphabet, B impressed alone will not raise A, but C only. Agreeably to which it is easy to repeat familiar sentences in the order in which they always occur, but impossible to do it readily in an inverted one.

#### 6. DAVID HUME (1711-1776)<sup>8</sup>

As all simple ideas may be separated by the imagination, and may be united again in what form it pleases, nothing wou'd be more unaccountable than the operations of that faculty, were it not guided by some universal principles, which render it, in some measure, uniform with itself in all times and places. Were ideas entirely loose and unconnected, chance alone wou'd join them; and 't is impossible the same simple ideas should fall regularly into complex ones (as they commonly do) without some bond of union among them, some associating quality, by which one idea naturally introduces another. This uniting principle among ideas is not to be consider'd as an inseparable connexion; for that has been already excluded from the imagination: Nor yet are we to conclude, that without it the mind cannot join two ideas; for nothing is more free than that faculty: but we are only to regard it as a gentle force, which commonly prevails, and is the cause why, among other things, languages so nearly correspond to each other; nature in a manner pointing out to every one those simple ideas, which are most proper to be

<sup>8</sup> From David Hume, *A Treatise on Human Nature*. Oxford: Clarendon Press, 1888, Bk. I, Part I, Sec. IV, pp. 10-12.

united into a complex one. The qualities, from which this association arises, and by which the mind is after this manner convey'd from one idea to another, are three, viz., *Resemblance*, *Contiguity* in time or place, and *Cause* and *Effect*.

I believe it will not be very necessary to prove, that these qualities produce an association among ideas, and upon the appearance of one idea naturally introduce another. 'T is plain, that in the course of our thinking, and in the constant revolution of our ideas, our imagination runs easily from one idea to any other that *resembles* it, and that this quality alone is to the fancy a sufficient bond and association. 'T is likewise evident, that as the senses, in changing their objects, are necessitated to change them regularly, and take them as they lie *contiguous* to each other, the imagination must by long custom acquire the same method of thinking, and run along the parts of space and time in conceiving its objects. As to the connexion, that is made by the relation of *cause and effect*, we shall have occasion afterwards to examine it to the bottom, and therefore shall not at present insist upon it. 'T is sufficient to observe, that there is no relation, which produces a stronger connexion in the fancy, and makes one idea more readily recall another, than the relation of cause and effect betwixt their objects.

That we may understand the full extent of these relations, we must consider, that two objects are connected together in the imagination, not only when the one is immediately resembling, contiguous to, or the cause of the other, but also when there is interposed betwixt them a third object, which bears to both of them any of these relations. This may be carried on to a great length; tho' at the same time we may observe, that each remove considerably weakens the relation. Cousins in the fourth degree are connected by *causation*, if I may be allowed to use that term; but not so closely as brothers, much less as child and parent. In general we may observe, that all the relations of blood depend upon cause and effect, and are esteemed near or remote, according to the number of connecting causes interpos'd betwixt the persons.

#### 7. JAMES MILL (1773-1836)<sup>9</sup>

*Thought* succeeds thought; idea follows idea, incessantly. If our senses are awake, we are continually receiving sensations, of the eye, the ear, the touch, and so forth; but not sensations alone. After sensations, ideas are perpetually excited of sensations formerly received; after those ideas, other ideas: and during the whole of our lives, a series of those two states of consciousness, called sensations, and ideas, is constantly going on. I see a horse: that is a sensation. Immediately I think of his master: that is an idea. The idea of his master makes me think of his office; he is a minister of state: that is another idea. The idea of a minister of state makes me think of public affairs, and I am led into a train of political ideas; when I am summoned to dinner. This

<sup>9</sup> From James Mill, *Analysis of the Phenomena of the Human Mind*. London: Longmans, Green & Co., 1878, Vol. I, Chapter III, pp. 70, 71, 78, 83, 86-88.

is a new sensation, followed by the idea of dinner, and of the company with whom I am to partake it. The sight of the company and of the food are other sensations; these suggest ideas without end; other sensations perpetually intervene, suggesting other ideas: and so the process goes on. . . .

Of the order established among the objects of nature, by which we mean the objects of our senses, two remarkable cases are all which here we are called upon to notice: the *synchronous order* and the *successive order*. The synchronous order, or order of simultaneous existence, is the order in space; the successive order, or order of antecedent and consequent existence, is the order in time. Thus the various objects in my room, the chairs, the tables, the books, have the synchronous order, or order in space. The falling of the spark, and the explosion of the gunpowder, have the successive order, or order in time. . . .

Our ideas spring up, or exist, in the order in which the sensations existed, of which they are the copies.

This is the general law of the "Association of Ideas"; by which term, let it be remembered, nothing is here meant to be expressed, but the order of occurrence. . . .

The causes of strength in association seem all to be resolvable into two; the *vividness* of the associated feelings; and the *frequency* of the association. . . .

That the association of two ideas, but for once, does, in some cases, give them a very strong connection, is within the sphere of every man's experience. The most remarkable cases are probably those of pain and pleasure. Some persons who have experienced a very painful surgical operation, can never afterwards bear the sight of the operator, however strong the gratitude which they may actually feel towards him. The meaning is, that the sight of the operator, by a strong association, call up so vividly the idea of the pain of the operation, that it is itself a pain. The spot on which a tender maiden parted with her lover, when he embarked on the voyage from which he never returned, cannot afterwards be seen by her without an agony of grief. . . .

The same cases furnish an illustration of the effect of *recency* on the strength of association. The sight, of the affecting spot by the maiden, of the surgeon by the patient, would certainly produce a more intense emotion, after a short, than after a long interval. With most persons, time would weaken, and at last dissolve, the association. . . .

Next, we have to consider frequency or repetition; which is the most remarkable and important cause of the strength of our associations. . . .

A sound heard once in conjunction with another sensation; the word *mamma*, for example, with the sight of a woman, would produce no greater effect on the child, than the conjunction of any other sensation, which once exists and is gone forever. But if the word *mamma* is frequently pronounced, in conjunction with the sight of a particular woman, the sound will by degrees become associated with the sight; and as the pronouncing of the name will call up the idea of the woman, so the sight of the woman will call up the idea of the name. . . .



8. JOHN STUART MILL (1806-1873)<sup>10</sup>

These ideas, or secondary mental states, are excited by our impressions, or by other ideas, according to certain laws which are called Laws of Association. Of these laws the first is, that similar ideas tend to excite one another. The second is, that when two impressions have been frequently experienced (or even thought of) either simultaneously or in immediate succession, then whenever one of these impressions, or the idea of it, recurs, it tends to excite the idea of the other. The third law is, that greater intensity in either or both of the impressions, is equivalent, in rendering them excitable by one another, to a greater frequency of conjunction.

The laws of the Association of Ideas . . . are the following: 1st. Similar phenomena tend to be thought of together. 2nd. Phenomena which have either been experienced or conceived in close contiguity to one another, tend to be thought of together. The contiguity is of two kinds; simultaneity, and immediate succession. Facts which have been experienced or thought of simultaneously, recall the thought of one another. Of facts which have been experienced or thought of in immediate succession, the antecedent, or the thought of it, recalls the thought of the consequent, but not conversely. 3rd. Associations produced by contiguity become more certain and rapid by repetition. When two phenomena have been very often experienced in conjunction, and have not, in any single instance, occurred separately either in experience or in thought, there is produced between them what has been called Inseparable, or less correctly, Indissoluble Association: by which is meant that . . . it is impossible for us to think the one thing disjoined from the other. 4th. When an association has acquired this character of inseparability, . . . things which we are unable to conceive apart, appear incapable of existing apart; and the belief we have in their co-existence, though really a product of experience, seems intuitive.

9. THE SPENCER-BAIN-BALDWIN THEORY<sup>11</sup>

*Hulsey Cason*

Herbert Spencer claimed that the relations between the pleasant and the beneficial and between the painful and the injurious are primary and were established by natural selection. "If we substitute for the word *Pleasure*," he wrote, "the equivalent phrase—a feeling which we seek to *bring into consciousness* and retain there, and if we substitute for the word *Pain* the equivalent phrase—a feeling which we seek to *get out of consciousness* and to keep out; we see at once that, if the states of consciousness which a creature endeavors to maintain are the *correlatives of injurious actions*, and if the states

<sup>10</sup> From J. S. Mill, *System of Logic, Ratiocinative and Inductive*. London: John W. Parker and Son, Bk. VI, 1856, Chapter IV, p. 428; and *An Examination of Sir William Hamilton's Philosophy*. Boston: William V. Spencer, 1865, Vol. I, Chapter XI, pp. 234-235.

<sup>11</sup> From Hulsey Cason, "The Pleasure-Pain Theory of Learning." *Psychological Review*, 39, No. 5, 1932, pp. 441-446.

of consciousness which it endeavors to expel are the *correlatives of beneficial actions*, it must quickly disappear through persistence in the *injurious* and avoidance of the *beneficial*. In other words, those races of beings only can have survived in which, on the average, agreeable or desired feelings went along with activities conducive to the maintenance of life, while disagreeable and habitually avoided feelings went along with activities directly or indirectly destructive of life; and there must ever have been, other things equal, the most numerous and long-continued survivals among races in which these adjustments of feelings to actions were the best, tending ever to bring about perfect adjustment." The assumption that animals and men tend to *repeat* those acts that are *pleasant*, and to *avoid* those that are *painful*, calls for some kind of *physiological* explanation, and Spencer gave an explanation in purely physiological terms. He said that *pleasure* accompanies *increased nervous activity* and that *pain* accompanies *decreased nervous activity*. Some of the random movements of an animal produce an increased nervous activity which is accompanied by pleasure, and this condition reinforces the movements and causes them to be repeated again. Painful movements tend to be eliminated in a similar way because of the decreased nervous activity. . . .

Alexander Bain accepted the principal features of Spencer's theory, but gave a more subjective interpretation of animal learning. He said that states of pleasure are connected with an increase, and states of pain are connected with an abatement of some, or all, of the vital functions. . . . "We suppose movements *spontaneously* begun, and accidentally causing pleasure; we then assume that *with the pleasure there will be an increase of vital energy, in which increase the fortunate movements will share*, and thereby increase the pleasure. Or, on the other hand, we suppose the *spontaneous* movements to give *pain*, and assume that, *with the pain, there will be a decrease of energy, extending to the movements that cause the evil*, and thereby providing a remedy. A few repetitions of the fortuitous concurrence of pleasure and a certain movement, will *lead to the forging of an acquired connection*, under the law of Retentiveness or Contiguity, so that, at an after time, the *pleasure or its idea* shall evoke the proper movement at once."

James Mark Baldwin based his careful treatment of the pleasure-pain theory of learning on the views of both Spencer and Bain. He was principally concerned with the way animals and men accommodate themselves to their environments. He thought that the law of habit which states that "The organism tends to repeat what it has already done" was an inadequate explanation, because, as he said, all movements are not equal before the law of habit. "Painful movements are inhibited, they tend to be reversed, squelched, utterly blotted out; how can this be explained on the foregoing formula for habit?"

Baldwin claimed that . . . there are three requirements: first, to get movements (his "spontaneity," as a substitute for Spencer's "diffused discharge" and Darwin's "purposeless contractions"); second, to get selections made from these movements (his "accidental success," of certain movements); and third, "some force that clenches and confirms some successful chance co-

incidence" ("pleasure and pain," identified with Spencer's "heightened nervous energy which finds its way to the lines of communication that have been opened up by the lucky coincidence").

#### IV. Connectionist Principles and Experiments

##### I. THORNDIKE'S LAWS OF LEARNING<sup>12</sup>

##### *E. L. Thorndike*

*The Law of Readiness.*—When any conduction unit is in readiness to conduct, for it to do so is satisfying. When any conduction unit is not in readiness to conduct, for it to conduct is annoying. When any conduction unit is in readiness to conduct, for it *not* to do so is annoying. By a satisfying state of affairs is meant one which the animal does nothing to avoid, often doing things which may maintain or renew it. By an annoying state of affairs is meant one which the animal does nothing to preserve, often doing things which put an end to it.

*The Law of Exercise.*—The Law of Exercise comprises the laws of Use and Disuse. The Law of Use is: When a modifiable connection is made\* between a situation and a response, that connection's strength is, other things being equal, increased. By the strength of a connection is meant roughly the probability that the connection will be made when the situation recurs. . . .

It should be borne in mind also that the connection is often a compound of several connections each having possibly a different degree of strength. Thus the connection between the situation, *understanding of and desire to fulfill the command, "Write that man's full name,"* and the response of writing *Jonathan Edwards Leighton* is multiple. . . .

The Law of Disuse is: When a modifiable connection is *not* made between a situation and a response during a length of time, that connection's strength is decreased.

*The Law of Effect.*—When a modifiable connection between a situation and a response is made and is accompanied or followed by a satisfying state of affairs, that connection's strength is increased; when made and accompanied or followed by an annoying state of affairs, its strength is decreased. . . .

[There are] also five characteristics of learning which are secondary in scope and importance only to the laws of readiness, exercise and effect:

*Multiple response or varied reaction.*—The first is the fact of *multiple response to the same external situation*. The animal reacts to being confined in the pen in several ways, and so has the possibility of selecting for future connection with that situation one or another of these ways.

*Set or attitude.*—The second of the five subsidiary principles is what we

<sup>12</sup> From E. L. Thorndike, *Educational Psychology*, Vol. II, *The Psychology of Learning*. New York: Bureau of Publications, Teachers College, Columbia University, 1914, pp. 1-4, 12-15, 20.

\* The vigor and duration of each "making" of a connection count, as well as the number of times that it is made.

may call the law of the learner's *Set* or *Attitude* or *Adjustment* or *Determination*. . . . Any process of learning is conditioned by the mind's "set" at the time.

*Partial activity* (or better, the law of *piecemeal activity*, or *activity by parts*).—A part or element or aspect of a situation may be prepotent in causing response, and may have responses bound more or less exclusively to it regardless of some or all of its accompaniments.

*Assimilation or analogy*.—To any situations, which have no special original or acquired response of their own, the response made will be that which by original or acquired nature is connected with some situation which they resemble. For  $S_2$  to resemble  $S_1$  means for it to arouse more or less of the sensory neurons which  $S_1$  would arouse, and in more or less the same fashion.

*Associative shifting*.—The ordinary animal "tricks" in response to verbal signals are convenient illustrations. One, for example, holds up before a cat a bit of fish, saying, "Stand up." The cat, if hungry enough, and not of fixed contrary habit, will stand up in response to the fish. The response, however, contracts bonds also with the total situation, and hence to the human being in that position giving that signal as well as to the fish. After enough trials, by proper arrangement, the fish can be omitted, the other elements of the situation serving to evoke the response. Association may later be further shifted to the oral signal alone. . . . We may get *any response of which a learner is capable associated with any situation to which he is sensitive*.

*Habit*.—The laws of connection forming or association or habit furnish education with two obvious general rules: (1) Put together what should go together and keep apart what should not go together. (2) Reward desirable connections and make undesirable connections produce discomfort. Or, in combined form: Exercise and reward desirable connections; prevent or punish undesirable connections.

## 2. THE BETA POSTULATE<sup>18</sup>

### *Knight Dunlap*

*A response (that is, even a single response) to a given stimulus pattern definitely increases the probability that on the reoccurrence of the same, or substantially the same, stimulus pattern, the same, or approximately the same, response will occur.* This principle I shall call the *alpha-postulate* of learning.

That this principle underlies the "law of frequency" is obvious, for if one response had no positive effect, then the summation of an indefinite number would have no effect, the sum of zeros being zero. . . .

If we no longer take the assumption of the positive effect of response as a divinely revealed truth, but as a mere postulate, it is at once seen that there are two other postulates possible. One of these, the *beta-postulate*, as I shall call it, is that response, in itself, has *no* effect on the future probability of the

<sup>18</sup> From Knight Dunlap, "A Revision of the Fundamental Law of Habit Formation." *Science*, 67, No. 1736, 1928, pp. 360-361.

same stimulus pattern producing the same response; the other, the *gamma-postulate*, is that response *decreases* the probability. Although the latter of these postulates is more consonant with our present-day neurological theories, and, as I shall show later, has interesting applications to a difficult psychological problem, a certain conservatism, which I think is intelligent, leads me to consider seriously the beta-postulate first.

If "repetition" has in itself no effect, but is important merely in that through it certain positive factors have their chance to operate, then it at once becomes a live possibility that negative factors also may be allowed to operate through repetition. Thus would be explained the apparent "neutralizing" of the effects of repetition, not as actual neutralization in this sense, but as either the operation of negative factors in the absence of positive, or the prevalence of the negative over the positive.

### 3. THORNDIKE'S LEARNING EXPERIMENTS <sup>14</sup>

Clark L. Hull

*The influence of mere repetition.*—The first twenty-two experiments reported concern, at bottom, the extremely fundamental question as to whether in the process of trial-and-error learning, the originally most frequently occurring of the several mutually exclusive reactions evoked by the stimulus situation will become more and more dominant with continued repetition quite apart from any reward or punishment or knowledge of success or failure. The typical experimental procedure of the initial experiments was either to estimate the lengths of numerous objects of systematically varied magnitude or to attempt to draw while blindfolded lines of systematically varied but specified lengths. These experiments agreed in general in showing that there was in truth a tendency for the reaction to become somewhat stereotyped, an extremely important finding; in so far the results supported the frequency hypothesis. It was found, however, that the reaction which was the most frequent in the end was nearly always one which was not the most frequent in the early stages of practice. This fact Thorndike considers as decisively in opposition to the hypothesis that mere frequency of repetition of a situation has any selective influence in trial-and-error learning. Repetition of a connection, on the contrary, is shown later in the volume to exert always a real though small strengthening influence. . . .

*Belongingness, impressiveness, polarity, and mental systems.*—The next major series of experiments concerns in one way or another what Thorndike calls "belongingness". . . . The various words of a sentence belong together in a way that the terminal word of one sentence and the initial word of the following sentence do not. Again, pairs of numbers such as 218 97, 432 16, etc., copied in columns from dictation are supposed to yield belongingness but "as near a minimum of satisfying after effect of the connection as is perhaps

<sup>14</sup> From Clark L. Hull, "Special Review: Thorndike's Fundamentals of Learning." *Psychological Bulletin*, 1935, 32, No. 10, pp. 808-814.

obtainable." Lastly, two words or nonsense syllables or numbers are said to belong together if the subject, because of instruction or otherwise, tries to associate the two in such a way that the presentation of the one will later recall the other. Several experiments, designed to show by simultaneous contrast the relative strength of learning where belonging does and does not exist and employing materials of the type just mentioned, yielded positive but comparatively weak values where there was presumably a very minimum of belonging. It is concluded that belongingness, whatever its nature turns out to be, is a factor of great importance in the learning process.

Passing from belongingness to impressiveness, it was found that in a word-number paired associate such as *kiss* 63, in which the first member is relatively impressive, the association with the number is much stronger than in cases where the initial member is presumably neutral, as in the case of the pair, *paste* 32. When the impressive word appears as the second member of the pair, the same facilitating tendency appears, but it is much reduced. This finding is held to have significance for practical learning situations.

One experiment was conducted on what the author calls *polarity*. By this is meant the tendency for stimulus-response sequences to function more readily in the order practiced than in the opposite. The polarity of common foreign expressions such as *exeunt omnes* and of longish common words such as *calendar* was investigated. The experiment was made up in the form of a pencil-and-paper completion test; sometimes the first portion of the expression or word would be given and the subject asked to supply the lacking part, and sometimes this procedure would be reversed. It was found with both kinds of material that the score of successes was much higher when the subject attempted to supply the ends when the beginnings were given, than vice versa; this confirms in an ingenious new way the relationship first shown experimentally by Ebbinghaus in 1885, but since called in question by Cason.

The volume also contains results from experiments on the influence of repetitions of a series upon the omission of its intermediate terms, *readiness*, *identifiability*, and *availability*; and the influence of *mental systems*. Considerable space is devoted to the latter subject. The method of investigation was a pencil-and-paper adaptation of the well-known association experiment, particularly as developed by Kent and Rosanoff. Here "mental system" is contrasted with simple habituation. For example, if the stimulus word *dear* evoked the response *sir*, this would be considered a case of simple habituation, but if the response were *fear*, some other principle than the mere frequency of sequence or use in the past must be operative. Such other determining principles are what are meant by mental systems. Several different varieties are pointed out, such as sensory systems, instinct systems, customary systems, and transcendental systems. In general these experiments, while not professing to be either very precise or very conclusive, do seem to indicate rather clearly that the great majority of associations obtained by the free association technique occur as the result of mental system rather than simple contiguous association. . . .

*The after effects of rewards.*—Having shown that mere repetition of a situation has no influence, but leaves the relative strengths of the different connections unchanged, and that the repetition of a connection has an influence apparently too small to account for the amount of learning, Thorndike finds the matter of after effects correspondingly more important. In this connection Thorndike remarks (p. 172), "How the after effect of a connection strengthens or weakens the corresponding connection may well be a matter for dispute, but that it often does so seems to me as sure as the fact of learning itself." Nearly forty different experiments were devoted to this basic problem. [In] one group of these experiments . . . [the subjects were directed] to attempt a trial-and-error task such as guessing at the meaning of rare English words from a five-choice test form such as, 18 edacious, daring—tractable—sober—devouring—polite. The subject's reaction in each case was announced by the experimenter at once as *Right* or *Wrong*, with the intention of giving the subject no opportunity to make even a covert correction. . . . This general procedure was repeated with many variations and on many kinds of materials, such as foreign language vocabularies, cards with lines ostensibly for discrimination but which, at the same time, possessed other characteristics which were surreptitiously subjected to the systematic influence of the *Right* and *Wrong* "effects." Thorndike concludes after carefully canvassing the results from this vast amount of experimentation (p. 270):

"On the whole, the results of Experiments 49 to 68 . . . prove that a satisfying after effect of a connection can and generally does strengthen that connection directly, irrespective of repetitions or rehearsals or recalls of the connection and of images or other representations of the after effects."

*Reward versus punishment.*—When Thorndike originally propounded his "law of effect," two effects were postulated, *satisfiers* and *annoyers*, the one supposedly serving to strengthen connections, and the other to weaken them. The numerous experiments concerned with the law of effect summarized above were directed primarily to the investigation of only one of these effects—that of satisfiers or rewards. It happens, however, that in most experiments on learning, both rewards and punishments of some sort are employed usually in close succession and in varying proportions. This fact naturally makes it difficult to tell how much the joint result is due to each. The problem is of enormous importance, both theoretically and practically. Thorndike attacks it with the vigor and persistence which it merits. To this end he devotes ten experiments.

A typical study involved the reworking of the experimental data obtained from one of the five-choice learning experiments previously performed. This employed a large number of such items as,

1. Abedul, ameer—birch—couch—carry—punch

The subject was required to guess one of the five English words as the equivalent of the initial Spanish word at the left, which reaction was at once

announced by the experimenter as *Right* or *Wrong*, the former announcement being regarded as a reward, and the latter as a punishment. In this way the list was gone over repeatedly so that many successive reactions (separated by varying but considerable intervals of time) were obtained from each subject to each Spanish word.

The results from six different experiments of the above nature are interpreted as showing an average of +52 per cent strengthening of an original tendency by one reward of a *Right* announcement, and of -4 per cent weakening (actually a slight strengthening) of a wrong response by one punishment consisting of a *Wrong* announcement. Concerning the results of these experiments Thorndike says (p. 288):

"So far as our results go, then, all the learning in these six experiments can and apparently must be credited to the strengthening by the announcement of *Right*. There is not a particle of evidence that the announcement of *Wrong* weakened these connections enough to counterbalance the strength they gained from just occurring. The wrong connections wane in relative frequency, not because they weaken intrinsically, but because they are supplanted by the right connections."

## V. Conditioning

### I. PAVLOV ON CONDITIONED REFLEXES<sup>15</sup>

#### I. P. Pavlov

*The elaboration of the conditioned reflex.*—We know very well that when we are hungry and want to eat, saliva flows if we see food. Hence the expression "the mouth waters." The investigation should extend to this phenomenon. What does it mean? There is, however, no kind of contact here. Concerning these facts physiology used to say that besides the ordinary stimuli, there is a *psychical stimulation* of the salivary glands. Very well. But what does this mean, how is it to be understood, how must we physiologists approach it? Neglect it we cannot, once it plays a part in the action of the glands. What cause have we to exclude this function? First let us consider the bare fact of psychical stimulation. It appears that psychical stimulation, i.e., the action of a *substance at a distance, is absolutely the same as when it is in the mouth. . . .*

But how is this to be studied? Taking the dog when he eats rapidly, snatches something in his mouth, chews for a long time, it seems clear that at such a time the animal strongly desires to eat, so he rushes to the food, seizes it, and falls to eating. He longs to eat. . . .

We absolutely prohibited ourselves (in the laboratory there was an actual fine imposed) the use of such psychological expressions as the dog guessed, wanted, wished, etc. Finally we came to look in another light upon all the phenomena with which we were concerned. . . .

It has been proved that *anything, whatever you will, from the external*

<sup>15</sup> From I. P. Pavlov, *Lectures on Conditioned Reflexes*. New York, International Publishers, 1928, pp. 263-270, 238, 66, 98.



*world, can be made a stimulus of the salivary glands.* Any sound whatever, odor, etc., may become a stimulus, and it will call out the activity of the salivary glands as definitely as does food at a distance. In regard to the exactness of the fact, there is no difference whatever, only we must make allowance for the circumstances under which the fact exists. What then are these conditions under which anything can become a stimulus of the salivary glands? The basic prerequisite is *coincidence in time*. The experiment proceeds this way: We take, for example, a sound, no matter what, which has no relation to the salivary glands. The sound acts on the dog, and he at the same time is fed, or acid is put into his mouth. After several repetitions of such a procedure the sound itself without either food or acid will stimulate the salivary glands. . . .

Thus, you see, that it is necessary to recognize the existence of two kinds of reflexes. One group of reflexes—ready from the time of birth—are purely conducting reflexes; but the other group—continually and without interruption being formed during the life of the individual, and just as regular as the first group—rest on the basis of another property of the nervous system, viz., its ability to make connections. One reflex can be called inborn, the other acquired; the first generic, the second individual. The congenital, generic, constant, stereotyped one we term *unconditioned*; the other, because it depends upon a multitude of conditions and constantly fluctuates in correspondence with many circumstances, we called *conditioned*, [the Russian word means conditional] showing in this way its characteristics as expressed from the point of view of the laboratory investigator. . . .

Here you see a diagram of our animal. On it are two black spots, one on the front leg, one on the thigh of the hind leg. These are the places where we attached the apparatus for mechanical stimulation of the skin. We proceeded as follows. After we have started mechanical irritation of these places with the pricking apparatus, then acid is poured into the mouth of the dog. The secretion of saliva produced by the acid is, of course, a simple inborn reflex. This was repeated several times, yesterday, today, and day after day. After a number of experiments a state of affairs results in which we get a flow of saliva when we begin only to irritate that spot of the skin; it is just as if we had poured acid into the dog's mouth, though in reality no acid is given. . . .

*Inhibition of the conditioned reflex.*—Now I start the mechanical irritation and receive as formerly a complete motor and secretory reaction, but this time I do not give the acid. One or two minutes pass and I repeat the experiment. Now the action already is less, the motor reaction is not so marked and there is not so much saliva. Again the acid is not given. We allow two or three minutes to elapse and repeat the mechanical irritation. The resulting reaction is still less. When we have done this four or five times, the reaction is entirely absent; there is no movement and no secretion of saliva. Here you have a clear, absolutely exact fact.

*Internal inhibition* arises every time that an elaborated conditioned stimulus of physiological activity is sometimes or always (in the last case under definite conditions) repeated without being followed by the unconditioned

stimulus with the help of which it was formed. This internal inhibition, as shown by our studies, is of different kinds: we distinguish between extinction, retardation, conditioned inhibition, and differentiated inhibition. . . .

This vanishing of the reflex as a result of repetition takes place with exact regularity only when the conditions remain absolutely the same, i.e., when the stimulation is produced by the same method, by the same person, and when this person makes the same movements and uses the same object (i.e., the same vessel and the same contents). Consequently, this identity of the conditions relates especially to everything which is connected in one way or another with the act of eating, or with the introduction into the dog's mouth of inedible substances. Fluctuations of other conditions, if they do not call out any additional reactions from the animal, have no significance. . . .

*Cerebral localization.*—In my laboratory nearly all parts of the cerebral hemispheres have been removed in stages, and conditioned salivary reflexes repeatedly tried. From these experiments I must conclude that there is no special part of the hemispheres on which, in a general sense, the existence of the conditioned salivary reflex depends.

But this does not exclude special relations of different parts of the hemispheres to the conditioned salivary reflexes. Tichomirov showed that the arc of various conditioned reflexes in certain of its parts is located in the cerebral hemispheres. Artificial conditioned reflexes to the salivary glands from the skin disappeared completely and could not be re-formed if the part of the cortex corresponding to the so-called motor region was removed. Similarly, on removal of the occipital lobes, the natural optical reflex to the salivary glands disappeared. Other conditioned salivary reflexes persisted, and even new ones could be formed. The same relations have been seen in other dogs in our laboratory, besides those described in the thesis of Dr. Tichomirov. From our experiments we see that for the building up of the conditioned reflexes certain cortical connections from various specific receptors are necessary—from the eye, the ear, the nose, the skin. There is ground for assuming that the same is true for all other conditioned reflexes. Thus we have the right to state that *the cerebral hemispheres are the organ of the conditioned reflexes*. . . .

## 2. ASSOCIATIVE SHIFTING AND THE CONDITIONAL REFLEX<sup>16</sup>

*E. L. Thorndike*

It has long been known that a response connected with a certain situation may be made even though the situation is not present in its entirety. . . .

The connection of X with B, by virtue of connecting it first with A + B and then omitting A, is the simplest case of associative shifting.

The primary assertion of Pavlov was that such connection of X with B, of which it was at first not a consequence, could be made *via* connection with A *even when X was a reflex response*, such as had been supposed to be

<sup>16</sup> From E. L. Thorndike, *Fundamentals of Learning*. New York: Bureau of Publications, Teachers College, 1932, pp. 401-402, 411.

unmodifiable in its attachments. The importance of this assertion is not that, if true, it proves the fact or law of associative shifting. That fact was well known and demonstrable by abundant evidence. It would be true of responses with modifiable attachments even if it were not true of the salivary reflex. It is proved daily by horses that stop when you say "Whoa," babies who smile at the sight of food, and by most of us in our thoughts and actions with symbols of all sorts.

The importance of the work of Pavlov and his pupils does not lie in the fact that a response, X, is connected with B by way of  $A \longrightarrow X$  and  $AB \longrightarrow X$ , but in the particular circumstances of this shift and in various features or characteristics observed in the  $B \longrightarrow X$  connection, or by means of it. This has not been understood by some psychologists who have used the term conditioned (properly conditional, the Russian word being *ooslovny*) for any connection derived by associative shifting or even for any learned connection, and have applied the features of the conditional or secondary connections with a reflex response described by Pavlov, to connections in general. . . .

It may well be that, for certain sorts of X's in certain statuses of the total organism, the mere precedence and overlapping of A by B will cause the shift universally. But there does seem to be restriction in the X's and in the statuses. The C-R phenomenon seems much less general than ordinary learning.

The phenomena of the conditional reflex are probably not the archetype of learning in general, the general basis or *anlage* out of which learning in general develops. They seem to be, on the contrary, a rather special case. Temporary modifiability by after effects without permanent habit formation seems to be a much more general and fundamental form. The *anlage* for learning in general seems to be in the early and widespread ability to continue or repeat a connection which is followed by certain states of affairs and to abandon or replace by some other a connection which is followed by certain states of affairs in both cases temporarily, with little or no permanent modification of the organism.\*

\*The references and questions pertaining to this chapter will be found at the end of Chapter VI.

## CHAPTER VI

### LEARNING: THEORIES OF LEARNING AND PRINCIPLES, OF HABIT FORMATION

*William Clark Trow, University of Michigan*

#### I. Learning and Gestalt

##### I. INDIVIDUATION<sup>1</sup>

*G. E. Coghill*

As a result of this investigation of the development of behavior a general principle has been discovered which, in my opinion, has wide, if not universal, application in vertebrates. The principle may be stated thus: The behavior pattern from the beginning (foetus stage) expands throughout the growing normal animal as a perfectly integrated unit, whereas partial patterns (reflexes) arise within the total pattern and, by a process of individuation, acquire secondarily varying degrees of independence. According to this principle, such an entity as a "simple reflex" never occurs in the life of the individual; complexity of behavior is not derived by progressive integration of more and more originally discrete units; the conception of chain reflexes as usually presented is not in accord with the actual working of the nervous system. On the other hand, within the total, ever-expanding integrated organism as a whole, partial patterns emerge more or less and tend toward independence and dominance, but, under normal conditions, always remain under the supremacy of the individual as a whole. An inappropriate degree of independence or dominance of a partial pattern constitutes abnormality or perversion of behavior.

##### 2. INDIVIDUATION IN LEARNING<sup>2</sup>

*K. Gottschald*

In one corner of the research laboratory, which does not look so much like a room for investigation as it does like a playroom, there is a box with about sixty long, slender, bright-colored building blocks. . . . At present among the children it is the fashion to build a tower up to the ceiling of the room. . . . Let us observe two different kinds of behavior in tower-building. An eight-year-old, mentally normal child comes into the research room with

<sup>1</sup> From G. E. Coghill, "The Early Development of Behavior in *Amblystoma* [Salamander] and in Man." *Arch. of Neurology and Psychiatry*, 21, No. 5, p. 989.

<sup>2</sup> From K. Gottschald, "Bedürfnis und Geschehen beim Psychisch Abnormen Kinde." *Beiträge zur Heilerziehung in Anstalten*. Aulhausen, 1931, pp. 18-40.

the desire to build a tower. He energetically gets the box of blocks and then begins to build a primitive kind of house. He soon realizes that this form of building will not lead him to his goal, and now, in a whole series of attempts at other kinds of construction, he finds a way to work up from the primitive building structure to a more highly developed one to fit the situation better. *Thus he learns during the whole course of the activity.* While at first he begins to rear a somewhat unsteady pile, in the course of the activity he comes to a point where he constructs a highly developed building form in which he perhaps places four blocks in a square, and on these, four more in a cross layer, so that on the whole a somewhat stable building results.

It is very characteristic that as a rule the same building psychologically is never repeated by the child. With every rebuilding of the tower he tries to find a form which is more satisfactory than the preceding one, and which seems to be a better adaptation in view of his objective.

Let us compare him with a mentally backward child of the same age. This child also keeps at the work, he also begins in a normal way with a primitive building form, e.g., placing two or three blocks on each other. If, then, this unstable building falls, psychologically the same one is repeated. We have frequently seen feeble-minded children undertake one and the same building twenty to thirty times. We have also filmed such a case; and the only difference in the form of action of such a backward child after the thirtieth repetition is that by this time he is more skillful and adept at placing his two or three blocks on each other. But in the structure of the act he shows no advance.

In regard to the question of the building ability of such children, it is of greatest importance to discover how far they can be advanced by helps and advice. It at once appears that the backward children understand suggestions only within the quite definite range of action possibilities, which they have at their disposal. . . .

If, for example, we show how the building blocks are set one on another, they only imitate, and in a short time fall back to their primitive building form. They imitate only outwardly in piecemeal fashion. . . .

In this tower building there soon develops a second problem as a subordinate activity, which does not appear until the child needs to reach the ceiling of the room. He must then in a definite phase of the procedure take up a subordinate activity, which appears in a natural manner, without our causing the child through instruction to shift or to start anew. In order to build above his reach the child uses a box as a step or platform, and so this function must be recognized in relation to the situation.

The eight-year-old average child naturally finds no difficulty in taking the box and using it for a step in the task. It is otherwise, however, with the backward child. He does not comprehend the situation at all but always tries to reach higher. Helps, which are given him in a systematic sequence, do not as a rule have any result. We come back immediately to the same problem we have described in the construction itself.

An imbecile conducts himself, for example, in the following manner: He runs to the corner where the box lies, climbs upon it, and joyfully holds the building blocks high in the air. Then he climbs down from the box again, stands in front of the tower, and again holds the building blocks in the air—great disappointment!

We see in this that the feeble-minded child, even in such simple processes, does not always grasp the *structure of the actual process*, but reproduces summarily *single fragments*, usually piecemeal, in any sequence which he had learned by chance, and which he repeats in exactly the same piecemeal fashion.

### 3. THE ORGANISMIC LAWS AND THE LEARNING PROCESS <sup>3</sup>

*R. H. Wheeler and F. T. Perkins*

(1) The Law of Field Properties: A whole is more than the sum of its parts.

(2) The Law of Derived Properties: Parts derive their properties from the whole.

(3) The Law of Determined Action: The whole determines the activities of its parts.

(4) The Law of Individuation: Parts of wholes come into existence through an emergence process called individuation, or structurization, or differentiation.

(5) The Law of Field Genesis: Wholes evolve as wholes.

(6) The Law of Least Action: The beginning of movement is a position in a system of energy where there is a high potential, but this high potential exists only with reference to a low. The movement from the high to the low takes place over the shortest route in time and is a process of equalizing the potentials.

(7) The Law of Maximum Work: Any influence affecting a system of energy, affects it throughout.

(8) The Law of Configuration: A system of energy always functions as a unit, and always adjusts itself to a multitude of disturbing influences.

### 4. LEARNING AND GESTALT <sup>4</sup>

*R. M. Ogden*

I am not contending that the Gestalt theory has arrived at a complete and satisfying explanation of the self-regulating improvement of behavior which we call learning; much less that it has rewritten the laws of physics. I do say that it offers a means of approach to the problems of growth, maturation, and learning more consonant with modern physics than are the pathway-

<sup>3</sup> From Raymond Holder Wheeler and Francis Theodore Perkins, *Principles of Mental Development*. New York: Thomas Y. Crowell Company, 1932, pp. 18-33.

<sup>4</sup> From R. M. Ogden, "The Gestalt Theory of Learning." *School and Society*, 41, No. 1060, 1935, pp. 531-533.

hypotheses of unit-acts which seem to underlie the usual mechanistic interpretations still current in psychology and education.

Let us take as a concrete instance the learning of mathematics, which begins with counting. First comes the pupil's observation of one, another one, and another one, to which the arbitrary names *one*, *two*, *three*, etc., are attached. Some educators seem to suppose that is all there is to arithmetic: the conditioning of this unconditional behavior with units, by graphic and linguistic terms, to which the pupil becomes inured by repetition and success. But the discovery of the cardinal number creates a Gestalt, the unit-members of which lose their identities as named units, and acquire a systematic meaning from which the whole scheme of measurement is derived.

Can we suppose that no significance really attaches to this discovery; that it is built up out of parts which have no intrinsic meaning; that the arbitrary "bonding" or "conditioning" of one unit-act with another could ever yield a science of mathematics? Such would seem to be the positivistic conclusion.

The Gestalt theory of learning begins at the other end. The organism is from the beginning a fully integrated unit. Its meanings are its integrated provocations, endurances and searchings. From an already organized beginning, search and endurance under provocation define and refine the patterns of behavior. The persistence of these patterns, once they are found, constitutes learning. A thing is learned when it is incorporated into a way of behavior, and in this process the organism and its environment are one. Persistence follows incorporation and depends upon the degree and kind of incorporation that takes place. Some ways are learned at once, and for all time. Others are temporary, and readily forgotten.

A brief description of the functional process of learning might run as follows:

Learning is any persistent improvement of behavior.

Improvement means facility in achievement.

Achievement means two things: positively, the attainment of an end, which is the completion of a behavioral pattern instigated by an organic need. Negatively, achievement involves avoidance and retreat from disaster, or any disruption of the integrated pattern which the organic need has motivated.

Thus, motivation is in the first instance self-regulation. Only secondarily, and as a result of an internal state of readiness, is it subject to involuntary arousal by appropriate stimulation from without—as when a flash of light occasions the winking of the eyes.

Learning is promoted in two ways: (1) by the acquisition of skill, and (2) by the acquisition of knowledge. Skill, the more primitive of the two, is the improvement of a biological pattern of response in terms of its general conformity to the environmental situation. One learns skilful behavior, individually and socially, by discovering the right rhythm of performance. The experiential criterion of such acquisitions is esthetic. One feels one's way through a skilful or tactful performance without the necessity, or even the possibility, of distinguishing the partial patterns of behavior which are employed. Skill

is always to some extent blind. The artist knows best after the completion of his work what he has been about, and what he was after. The skilled artisan need give little or no thought to the logic of his successive manipulations. It is the rhythm of a self-regulating development of a pattern fully integrated from the start which holds him to his task until his achievement is complete.

But in addition to primitive skill, behavior is also improved by knowledge. This means discernment of the partial patterns involved. It means abstraction of their salient features, such as weight, measure, shape, and quality. These features can be named, numbered, graphed, that is, abstracted and dealt with as surrogate behaviors. They, too, can be felt rhythmically and their development can be followed esthetically. But they can also be placed and dated, recorded and compared, as the background of their concrete total behaviors can not.

Thus, the realm of abstraction grows out of concrete total behavior as partial patterns emerge which qualify themselves as quasi units, or the dimensions of things.

In dealing with discernible units or things we enter the realm of logic and learn the principles of order which made blind skill possible. We learn to follow directions of orientation, impulse and differential sensitivity. We learn to individuate partial patterns and to regard their internal structure and constancy; to identify a person or thing in varying surroundings. We learn to assimilate one thing with another, one event with another, when, to begin with, these were learned separately as partial patterns in different contexts. Finally, we learn to redefine one thing or event when it is capable of functioning as another thing or event in a different context. That which had one use is found to have another, as well. Versatility and the so-called transfer of training are thus explained.

In brief, a Gestalt theory of learning posits a completely integrated behavior which can be improved by the elaboration of partial patterns within the whole. These patterns remain under the domination of the whole organism. Any undue dominance of a partial pattern leads to abnormality or perversion. The positivist's view of this process is not only naïve, it also leads to abnormality and perversion of behavior, whenever it leads his pupil to identify operations or facts as independent units or entities. Radical behaviorism insists that in order to learn any subject, be it linguistic, mathematical, scientific or historical, the pupil must incorporate it in his behavior as something he wants. The satisfaction of his adjustment is the criterion of his achievement. He learns the subject when it belongs to him as one of his ways of behavior. This notion of behavior underlies the Gestalt theory of learning.



## II. Summary of Learning Theories

I. CHARACTERISTICS OF LEARNING<sup>5</sup>*Edwin R. Guthrie*

*Conditioning.*—Stimuli which accompany a response tend, on their recurrence, to evoke that response. Sometimes called "association by contiguity in time" or "redintegration" or "associative memory." This generalization has long been recognized.

*Inhibitory conditioning.*—Stimuli which tend to call out a response may lose that tendency, or, if they occur without the response, go further and acquire inhibiting effects. "Negative adaptation" is the term proposed by Stevenson Smith and the writer a number of years ago for this characteristic of learning. The term "conditioned inhibition" has also been used. "Inhibitory conditioning" is perhaps better than either.

*Remote conditioning.*—So little attention has been given to the precise time factors in conditioning that conditioning has generally been taken to include those cases in which the conditioning stimulus does not immediately precede its response, but may, an interval intervening, precede it or even follow it. According to Pavlov the interval in delayed and trace conditioning may be as great as thirty minutes. Pavlov would deny that the conditioning stimulus may follow its response, but studies in backward association would indicate that something resembling conditioning may occur in man when we have the time order, first response, then stimulus.

*Effects of practice.*—Practice sometimes makes perfect. Repetition of a sequence of stimulus and response seems to establish the certainty of the sequence more firmly. "Laws" of frequency or exercise are included in most theories of learning.

*Forgetting.*—The effects of learning seem to disappear at a somewhat predictable rate. The "curve of forgetting" discovered by Ebbinghaus for non-sense material applies with variations to many forms of learning, characterized by rapid disappearance at the interval just following the last practice and a more gradual disappearance as time goes on. There are some odd exceptions to this general form of the curve, however. It is reported that the disappearance of learning is affected by intervening activity. After a period of sleep, retention is better than after a period of waking. . . . After a period occupied in a quite different activity, retention is better than after a period in which the situation is like (but not too like) the situation during learning.

*Temporary extinction.*—In direct contradiction to the preceding generalization, Dunlap and Pavlov have pointed out cases in which the repetition of a habit sequence serves to disrupt the habit. Dunlap reports the successful use of practice to break up annoying habits. Pavlov reports (and his report is well verified by common human experience) that conditioning will disappear if a

<sup>5</sup> From Edwin R. Guthrie, "Conditioning as a Principle of Learning." *Psychological Review*, 37, No. 5, pp. 412-416.

conditioning stimulus is repeatedly given at short intervals without the support of the unconditioned stimulus. After an interval the habit will be found somewhat restored.

*Emotional reinforcement.*—The familiar fact that learning is facilitated by states of general excitement has been illustrated by recent experiment showing that nonsense material is better learned by subjects under slight muscular strain than by relaxed subjects. We may associate this characteristic of learning with what has been called dynamo-genesis, the facilitation of learning by adventitious stimuli which might well be expected to diminish learning.

*Irradiation.*—Lacking a better term, we may use the one offered by the translator of Pavlov for a phenomenon which he describes and which is easily demonstrated for human behavior as well as for animal behavior. After a stimulus has been established as a conditioner of a response, it may be found that other stimuli to the same class of receptors or, in some cases, to different receptors, are able to elicit the response, though they lacked this connection before the experiment. With a touch on the flank used in connection with acid as a stimulus for salivary secretion, touches on other parts of the body prove less effective as their distance from the flank is increased. With practice of the original combination this conditioning power of neighboring stimuli tends to disappear.

*Patterns.*—Having learned to read, we find that reading appears to be more or less independent of the actual distance of the print from our eyes, and this means that similar patterns of stimuli are effective without reference to the particular receptor elements stimulated. The Gestalt psychologists assert that this response to patterns as such occurs without learning. It is here included as a characteristic of learning because the writer believes that it is dependent on learning. . . .

*Insight.*—As in the case of reaction to patterns as such the Gestalt psychologists have pointed out that the higher animals and man occasionally meet a new situation with an adequate and new response. The process of trial and error made so much of in recent behavioristic accounts of learning seems to be omitted in many acts, which are characterized by the Gestalt psychologists as cases of insight. This fact is here listed among the characteristics of learning because it is also the author's belief that insight is dependent on learning. . . .

The experimental literature suggests many more characteristics of learning. Most of these, however, are either debatable or are complicated with factors other than learning which make their significance for a theory of learning slight. The experiments on *distribution of practice* are complicated by fatigue. The results in *whole and part* learning are ambiguous and depend on the nature of the material. So-called "reminiscence," in which children prove to be able to reproduce more material after an interval than at the end of practice, has not so far been rid of the suspicion of continued unrecorded practice. A theory of learning which undertakes to explain all the suggested facts is apt to be caught predicting results which do not occur.

Is there a single formula which can be made to include all or most of the established generalizations concerning the nature of learning? If there is such a formula it will in all probability be some form of the ancient principle of association by contiguity in time, which has been a part of all theories of memory and learning since before Aristotle, and has retained its essential character in spite of a variety of names, such as "conditioning," "associative memory," "redintegration." . . .

In order to examine its possibilities, the principle of conditioning may be stated in a simple form: *Stimuli acting at a given instant tend to acquire some effectiveness toward the eliciting of concurrent responses, and this effectiveness tends to last indefinitely.*

## 2. THEORIES OF LEARNING<sup>6</sup>

J. F. Dashiell

For the present-day commentator the manifold theories of learning naturally group themselves into three general types. Historically oldest is the English *trial-and-error* mode of description: its theoretical roots in writings of Bain, its pointed application by Lloyd Morgan, and its experimental verification in America by Thorndike. Historically next appeared the Russian contribution of the *conditioned-response* concept, growing out of physiological experiments of Pavlov and Bekhterev, and greatly elaborated by them, in which they were followed in America by Watson. More recently has come the German *Gestalt* doctrine, spreading from Wertheimer's work on perception to more definite applications to learning by Köhler. Certain other favorite viewpoints there are, claiming originality and inspiration; but they are, I believe, subsumable under one of those mentioned: e.g., the varying emphases upon the "dynamic field," the "sudden insight," and the "purposive" characters are subsumable, without violence, under the third.

The suggestion I am making is that we set up tentatively some of the major *theoretical emphases of this or that of the three schools* just mentioned, and then canvass the experimental bases of all three to note whether such emphasized points may not actually *be found in the data of all*. . . . I shall enunciate one principle at a time; and in connection with it I shall point out its appearance (in some degree) in *conditioned-response* experiments, then in *trial-and-error* experiments, and then in *Gestalt* experiments.

[At this point Dashiell assembles evidence which shows the principles or elements common to these three major types of learning experiments. They are as follows:

- (1) The subject must be motivated.
- (2) A field or complication of motives\* exists.
- (3) Obstruction is offered to the principal motive.

<sup>6</sup> From J. F. Dashiell, "A Survey and Synthesis of Learning Theories." *Psychological Bulletin*, 32, 1935, No. 4, pp. 261-262; 270-274.

\* In the case of the word "motive," as in those of other words to be used in headings to follow, the writer has no thought of insisting upon his word choice as the only acceptable

- (4) Hyperactivity (or hypertonicity) is aroused.
- (5) The response is multiple and varied.
- (6) The response is to relations of stimuli.
- (7) The important relation is between means and objective.
- (8) Selection or least action appears.
- (9) The selected responses originally occur fortuitously.
- (10) The effects of responses are crucial.
- (11) The rate of learning varies in degrees from gradual to abrupt.]

The question naturally arising now is: How has there come about such a distinction of theories, such an array of conflicting polemic camps?

One answer is to the effect that in the comparative survey of learning in different animal forms and phyla there has often been a tendency to take as peculiar to some particular animal level a sort of learning that happens to be more noticeably characteristic in its case—as if it were its sole characteristic and its exclusive characteristic. For example, it may seem that the trial-and-error sort of learning is the prototype; for is it not recognizable in the metazoa and the protozoa, and is it not the more characteristic of the adjustments of subhuman forms than of rational human beings? The conditioned-response type is likely to be thought of then as appearing only later, after the differentiation of reflex movements out of more tropic, organismic behavior, and hence best observable in vertebrates and especially in mammals. And, finally, insightful adjustments are likely to be conceived as late products of mental evolution, when in anthropoids and especially in man the appreciation and elaboration of the relationships of environmental stimuli are made possible. Trial and error, then, is the prototype; conditioned response, the product of evolved individuation; insight, the expression of further-evolved organization.

(1) Concrete examples, however, show us the hastiness and superficiality of this phylogenetic view. Consider the experiments upon the lowliest of all animals, that by Mast and Pusch on the amoeba. Their description of how this animal eventually learns to send out its pseudopods not into a lighted area but in the other direction reads, at first, like a description of trial and error. But the similarity between retraction of pseudopod from light and the retraction of a human finger from an electrified grid raises a strong suspicion that amoeba's negative response may be subsumed under the head of conditioning. And, on the other hand, the similarity between the amoeba's response to the lighter-of-two-areas and the chick's or ape's response to the darker-of-two-grays in Köhler's studies, suggests that we may have in primordial form just another case of relational or configural learning.

(2) At the opposite pole of subhuman behavior we have the studies on monkeys and apes by Yerkes, Bingham, Köhler, Klüver, and others, in which detour, string-pulling, stick-using, stick-making, box-stacking, etc., are employed. In such accounts the try-try-again feature is outstanding, but so also

one. Alternative words may be substituted in several cases; thus for "motive" substitute "desire," "need," "tension," or "valence."

is the fact that these "tries" are responses to this, that, and the other configuration or relationship among boxes, doors, and the lure; this is trial and error, then, and insight, too. What of conditioning? The behavior is exceedingly complex; and it is a tenable supposition that upon analysis it would break down into conditioned responses. The latter point borrows cogency from Klüver's work on monkeys in which he analyzes at great length by the pulling-in technique that essential of all insight—reaction to simple configurations as ratios; for it is all of a piece with the conditioned-response theory to explain the choice of strings-to-be-pulled on the basis of negative conditioning to the wrong and positive conditioning to the true string.

(3) As with phylum changes in the animal kingdom, so with age changes in the individual; for in the genetic treatment of learning in the human, again the trial-and-error type has appeared as the crudest and the most characteristic of earliest infancy, while conditioning, and much more, insightful response, has been supposed to be better displayed by older children and adults. But compare some typical experiments upon infant learning. In the study by Sherman and Sherman, diffuse defense reactions were observed in the youngest infants; but with increase in age, they became less indefinite and irregular, and a more co-ordinate response became established. Quite a different study is that made by Jones in which conditioned galvanic skin reflexes were established in three infants from three to nine months of age. And still different is another experiment by Jones wherein he found kindergarten children to show consistent tendencies to make relative choices. After being trained to choose one card differing in size, form, brightness or color from another card, they tended to choose that one of any pair that bore the same relative character. From all of which we see that in infancy learning may appear that will fit under any of the three dominant theories.

(4) At the opposite pole of human behavior we have an array of experimental studies of learning on the level of thinking by the adult. That the type of adjustment called thinking exhibits the feature we call trial and error is apparent enough. Ruger's early work brought this out. Heidebreder's more recent study, too, is replete with accounts, both subjective and objective, of how her subjects slashed about in their search for solution. But the subject was hardly just "slashing about"! Rather was he veering and tacking carefully between one and another manner of "noticing" and "thinking about" this and that, i.e., between modes of perceiving, conceiving, imagining, inferring, etc., or, in the language of the Gestalt school, of *structuring* the situation.

So much for trial and error and insight: what of the conditioned-response view of thinking? We must admit this to be a large order. A suggestive beginning has, however, been made in Lepley's experimental demonstration that some phenomena of memorization are identical with, or, at least, similar to some phenomena in conditioning. A mere beginning, to be sure, and one still far removed from the complexities of original and creative thought; but some *theoretical* envisagements of intellectual processes in terms of conditioning have been offered by others; and time awaits their experi-

mental verification. Meanwhile, the very sound of some of the principles of conditioning have the ring of some of the principles of thought processes—"generalization," "differentiation," "inhibition," "delayed reaction," "positive and negative induction," and the like.

We may conclude, then, that ontogenetically as well as phylogenetically, learning that goes on at any one level of development does not show the *exclusive* appropriateness of any one of our three general learning theories.

Another explanation for the presence of these three major learning theories in the field is to be found in their *experimental* origins. Each is the rationalization and interpretation of a *technique*.

(1) The trial-and-error doctrine grew out of observations and experiments on the behavior of dogs and cats, partly as a critique from the genetic point of view, of the popular anthropomorphizing tendency in the usual anecdotal accounts; and the fruitfulness of the approach has led to an historical procession of white rats through their mazes and problem boxes. Now, for one thing, it is important to note that in all of these experiments the subjects have been *whole* animals, *whole* organisms. For another thing, it is to be noted that, for one reason or another, the situation which each one was called upon to solve was one that *did not provide* or include a *stimulus* pattern that would call out some *response that was already a part of the animal's repertoire* and adequate to the situation; no meat powder to elicit the all-important salivary reflex, no stick with which simply to reach out for the all-important banana.

(2) The conditioned response doctrine arose out of experimentations in a physiological laboratory, themselves growing out of an interest in gastric and salivary secretions. The dog studied now was not the *whole* dog, at least not intentionally, for experimental *isolation* of the *particular gland* or the *particular motor unit* was attempted, and at the same time a similar *isolation of stimulus* from the remainder of the environment, to the extent of providing sound-proof, light-proof, vibration-proof rooms.

(3) The insight doctrine of learning grew out of observations primarily upon higher animals, which were left more at liberty to adopt whatever responses they would. The *whole animal* was studied again; for it, however, the solution of the problem was not indefinitely delayed by the necessity of developing a new sensorimotor co-ordination, but was rendered possible just as soon as the animal would *notice* some critical thing about it all, *some significant relationship*. In conventional psychological language, the problem was not so much a *motor* one as a *perceptual* one.

Thus, our three main learning theories have sprung from quite distinct origins in experimental research. Human enthusiasms, propaganda, and polemics have emphasized the distinctness of these origins and exaggerated the contrasts between the derived theories. It should be evident enough, however, from the many references in the preceding pages that, after all, the differences of the theories are founded on matters merely of more and less.

For one thing, it is a matter of *how far you want to go in your experi-*

*mental analysis* of learning. If you want to get down to the simplest possible segments of learning behavior, you can find reflexes substituted for other reflexes. It is like a physiological analysis of particular component body processes. The immensely important question remains, however, whether you can reconstitute and characterize the whole merely out of knowledge of the component parts.

For another thing, it is a question of *how far you want to test for capacity to respond to relationships*. If you want to explore the higher reaches of such capacities you find yourself working with intellectual processes of abstraction, conceptualization, inference, and inspiration. It is the danger of careless and gratuitous theorizing here, however, that must be guarded against.

### 3. THE WEAKNESS OF NEUROLOGICAL EXPLANATIONS OF HABIT FORMATION<sup>7</sup>

*J. L. Mursell*

It should always be explicitly understood that any explanation of behavior in terms of the formation and functioning of neurograms is hypothetical. . . . It is instructive to glance at a few of the constructions which have been involved. First we find several theories which begin to build up from the assumption of modal or qualitative differences among the energies of various nerves. Such assumptions are not merely without any foundation in ascertained fact, but are directly opposed to the findings of neurology as far as these go in this direction. Again in McDougall's view of inhibition by drainage we have a piece of ingenuity which is to be criticized as entirely unverifiable. The concept of the synaptic planes as one-way valves is on a somewhat different footing, for there is some respectable factual evidence in favor of it. But it is by no manner of means established, and to try to import it as one of the fundamentals of psychological explanation cannot be warranted.

But the mainstay of neurological associationism is its explanation of habit as due to the lowering of synaptic resistances. Even here, however, there is one important difficulty noted by Meyer, in connection with the short-circuiting supposed to be set up by habit. If we assume that a direct path has been substituted for a devious one, it is obviously a question why the direct path was not used in the first instance. The explanation offered by Meyer is that new neurons actually come into existence, or at least ripen into capacity to function, under the tension of the system induced by constant repetition. It would be hard to find a better illustration of the entirely hypothetical character of these neurological explanations of behavior.

What is true in this special case holds also of the general account of habit in terms of lowered synaptic resistance. As Herrick points out, we have simply no knowledge whatever of the neurological meaning of habit. The assumption that the formation of habit involves functional changes in the synapses is, however, peculiarly significant. The logic of the whole procedure

<sup>7</sup> From J. L. Mursell, "The Principle of Integration in Objective Psychology." *American Journal of Psychology*, 35, No. 4, 1924, pp. 3-5.

seems most viciously *a priori*. Habit formation manifestly does not involve any immediate and obvious change in either the receptors or the effectors. Again, there are difficulties in believing that the change occurs in the sensory or motor fibers. And the known physiological modifications of the cell bodies of the central neurons seem irrelevant as a possible basis for an account of habit. There remain the synapses, and as nobody knows very much about them, nobody can contradict almost any hypothesis that it may serve our turn to frame regarding them. The whole account is not an explanation at all, but an appeal to ignorance.

If we approach this point of view from another angle, a further set of difficulties emerges. Not only are the various constructions and brain schemes offered by neurological associationism entirely unwarranted by any direct knowledge we possess of nervous function, but they almost egregiously fail to account for the phenomena of conscious life for which they are supposed to provide a solid basis. The value of a good hypothesis is that it directs empirical investigation. But here the order is reversed. First we investigate and tabulate our facts, and then we indulge in speculation to account for them. No important psychological discovery has ever been made by drawing brain schemes. We do not begin with a construct of nervous function, and then go on, in the manner of the mathematical physicist, to demonstrate such phenomena as retroactive inhibition, perseveration, the sequence of forgetting, the optimum distribution of practice periods, the relation of affect to memory, and the like. Our procedure, in fact, is precisely the reverse of this. Our constructions are nothing but gratuitous additions to ascertained facts.

It is often urged as an apology for the treatment of the phenomena of learning in terms of brain schemes that at least it has a certain pedagogical value. This, however, raises the question in its widest and most crucial form. It may undoubtedly be easy\* for an elementary class to grasp the plausible conception of the wearing down of cortical paths; and if this is no more than an innocent superfluity, used only for illustrative purposes, perhaps no damage has been done. But it is a question whether it does not involve an essentially misleading notion of the nature and purpose of psychological analysis. Haldane's views become relevant here. He argues that the biological categories are not adequate for psychology, and that explanations of mental life in terms of nervous function are to be disallowed because they treat of the whole in terms of the part. . . . When an account in neural terms is forced, it becomes purely schematic and hypothetical, and in fact essentially outside the realm of scientific psychology.

### III. Testing Retention <sup>8</sup>

*Herman Ebbinghaus*

A poem is learned by heart and then not again repeated. We will suppose that after a half year it has been forgotten: no effort of recollection is able to

<sup>8</sup> From Hermann Ebbinghaus, *Memory—A Contribution to Experimental Psychology* (1885). New York: Bureau of Publications, Teachers College, Columbia University, 1913, pp. 8-9, 53-54, 22-23, 65, 76.



call it back again into consciousness. At best only isolated fragments return. Suppose that the poem is again learned by heart. It then becomes evident that, although to all appearances totally forgotten, it still in a certain sense exists and in a way to be effective. The second learning requires noticeably less time or a noticeably smaller number of repetitions than the first. It also requires less time or repetitions than would now be necessary to learn a similar poem of the same length. In this difference in time and number of repetitions we have evidently obtained a certain measure for that inner energy which a half year after the first learning still dwells in that orderly complex of ideas which make up the poem. After a shorter time we should expect to find the difference greater; after a longer time we should expect to find it less. If the first committing to memory is a very careful and long-continued one, the difference will be greater than if it is desultory and soon abandoned.

Instead of the simple phenomenon—occurrence or nonoccurrence of a reproduction—which admits of no numerical distinction, I intend therefore to consider from the experimental standpoint a more complicated process as the effect, and I shall observe and measure its changes as the conditions are varied. By this I mean the artificial bringing about by an appropriate number of repetitions of a reproduction which would not occur of its own accord.

I define the inner stability of a series of ideas—the degree of its retainability—by the greater or less readiness with which it is reproduced at some definite time subsequent to its first memorization. This readiness I measure by the amount of *work saved* in the relearning of any series as compared with the work necessary for memorizing a similar but entirely new series.

The interval of time between the two processes of memorization is of course a matter of choice. . . .

In order to test practically, although only for a limited field, a way of penetrating more deeply into memory processes—and it is to these that the preceding considerations have been directed—I have hit upon the following method.

Out of the simple consonants of the alphabet and our eleven vowels and diphthongs, all possible syllables of a certain sort were constructed, a vowel sound being placed between two consonants.

These syllables, about 2,300 in number, were mixed together and then drawn out by chance and used to construct series of different lengths, several of which each time formed the material for a test. . . .

The nonsense material, just described, offers many advantages, in part because of this very lack of meaning. First of all, it is relatively simple and relatively homogeneous. In the case of the material nearest at hand, namely poetry or prose, the content is now narrative in style, now descriptive, or now reflective; it contains now a phrase that is pathetic, now one that is humorous; its metaphors are sometimes beautiful, sometimes harsh; its rhythm is sometimes smooth and sometimes rough. There is thus brought into play a multiplicity of influences which change without regularity and are therefore disturbing. Such are associations which dart here and there, different degrees of

interest, lines of verse recalled because of their striking quality or their beauty, and the like. All this is avoided with our syllables. . . .

The investigations in question fell in the year 1879-80 and comprised 163 double tests. Each double test consisted in learning eight series of thirteen syllables each (with the exception of thirty-eight double tests taken from 11-12:00 A.M. which contained only six series each) and then in relearning them after a definite time. The learning was continued until two errorless recitations of the series in question were possible. The relearning was carried to the same point. . . .

It will probably be claimed that the fact that forgetting would be very rapid at the beginning of the process and very slow at the end should have been foreseen. However, it would be just as reasonable to be surprised at this initial rapidity and later slowness as they come to light here under the definite conditions of our experiment for a certain individual, and for a series of thirteen syllables. One hour after the end of the learning, the forgetting had already progressed so far that one half the amount of the original work had to be expended before the series could be reproduced again; after eight hours the work to be made up amounted to two thirds of the first effort. Gradually, however, the process became slower so that even for rather long periods the additional loss could be ascertained only with difficulty. After twenty-four hours, about one-third was always remembered; after six days about one fourth, and after a whole month fully one fifth of the first work persisted in effect.

#### IV. Incentives and Habits

##### I. MAXIMS OF HABIT FORMATION<sup>9</sup>

*William James*

In Professor Bain's chapter on "The Moral Habits" there are some admirable practical remarks laid down. Two great maxims emerge from his treatment. The first is that in the acquisition of a new habit, or the leaving off of an old one, we must take care to *launch ourselves with as strong and decided an initiative as possible*. Accumulate all the possible circumstances which shall re-enforce the right motives; put yourself assiduously in conditions that encourage the new way; make engagements incompatible with the old; take a public pledge, if the case allows; in short, envelop your resolution with every aid you know. This will give your new beginning such a momentum that the temptation to break down will not occur as soon as it otherwise might; and every day during which a breakdown is postponed adds to the chances of its not occurring at all.

The second maxim is: *Never suffer an exception to occur till the new habit is securely rooted in your life*. Each lapse is like the letting fall of a ball of string which one is carefully winding up; a single slip undoes more than a

<sup>9</sup> From William James, *Principles of Psychology*. New York: Henry Holt and Company, 1890, Vol. I, Chapter IV, pp. 122-127.

great many turns will wind again. Continuity of training is the great means of making the nervous system act infallibly right. . . .

A third maxim may be added to the preceding pair: *Seize the very first possible opportunity to act on every resolution you make, and on every emotional prompting you may experience in the direction of the habits you aspire to gain.* It is not in the moment of their forming, but in the moment of their producing motor effects, that resolves and aspirations communicate the new "set" to the brain. . . .

No matter how full a reservoir of maxims one may possess, and no matter how good one's sentiments may be, if one have not taken advantage of every concrete opportunity to *act*, one's character may remain entirely unaffected for the better. With mere good intentions, hell is proverbially paved. . . .

As a final practical maxim, relative to these habits of the will, we may, then, offer something like this: *Keep the faculty of effort alive in you by a little gratuitous exercise every day.* That is, be systematically ascetic or heroic in little unnecessary points, do every day or two something for no other reason than that you would rather not do it, so that when the hour of dire need draws nigh, it may find you not unnerved and untrained to stand the test. Asceticism of this sort is like the insurance which a man pays on his house and goods. The tax does him no good at the time, and possibly may never bring him a return. But if the fire does come, his having paid it will be his salvation from ruin. So with the man who has daily inured himself to habits of concentrated attention, energetic volition, and self-denial in unnecessary things. He will stand like a tower when everything rocks around him, and when his softer fellow mortals are winnowed like chaff in the blast.

## 2. FACTORS AND CONDITIONS OF IMPROVEMENT<sup>10</sup>

*E. L. Thorndike*

*External conditions of improvement.*—The conditions of improvement may best be reviewed under four heads—external conditions, such as length of practice period, time of day, amount of food, and the like; physiological conditions, such as dosing with alcohol or caffeine or attack by certain diseases; psychological conditions, such as interest and worry; and educational conditions such as the organization of the practice drills and the methods of work taught to the learner. . . .

The experimental results obtained justify in a rough way the avoidance of very long-practice periods and of very short intervals.\* They seem to show,

<sup>10</sup> From E. L. Thorndike, *Educational Psychology*, Vol. II, *The Psychology of Learning*. New York: Bureau of Publications, Teachers College, Columbia University, 1913, pp. 193, 194, 214, 226, 230-234.

\* What period length shall be considered "very long" depends on the amount of variety and satisfyingness the function shows. Two hours is thus a very long period for addition or learning thirty-two-syllable nonsense series, but perhaps not for playing golf or chess.

What interval between periods shall be considered "very short" depends on the length of the periods themselves, and also on the character of the function. For adding practiced in twenty-minute periods, an interval of five minutes would be very short, and probably also one

on the other hand, that much longer practice periods than are customary in the common schools are probably entirely allowable, and that much shorter intervals are allowable than those customary between the first learning and successive "reviews" in schools. . . .

*Psychological conditions of improvement.*—Whatever does favor the repetition and satisfyingness of the desirable bonds, and the disuse and annoyingness of the undesirable bonds, will, other things being equal, favor improvement. The most noteworthy psychological conditions of improvement come under this head—are means of directing the forces of use and satisfaction in favor of desirable and against undesirable bonds. Three of these—ease of identification of the bonds to be formed or broken, ease of identification of the states of affairs which should satisfy or annoy, and ease of application of satisfaction or annoyance to them—are direct consequences of the laws of learning. The next five, which we may call the "interest series"—interest in the work, interest in improvement, an active, inquiring attitude, attention, and acceptance of the work as significant to the worker's wants—are potent partly because they help to produce variations, still more because they produce relevant and desirable variations, but most of all, perhaps, because they reinforce the good, and eliminate the bad ones. . . .

To these . . . we may add two that would perhaps be disputed—the absence of irrelevant emotional excitement, and the absence of worry. . . .

*Educational conditions of improvement.*—Under the educational conditions of improvement all the conditions which school authorities provide might be treated. Their arrangement of the school program would then lead us back to conditions of time of day, length of practice periods and intervals and the like which have been described under external conditions. Their management of heat, light, and ventilation, their isolation of children affected by contagious diseases, and the like, would lead us back to the physiological conditions. Their selection and arrangement of subject matter and their methods of teaching would lead us back to the psychological conditions of interest, freedom from worry, easy identification of bonds and the like, which have just been described. The relation of the time schedule and the school hygiene to improvement need not be discussed here, but the relation of selection and arrangement of subject matter and of methods of guiding the pupils' responses to their rate of improvement will give a useful review and clarification of certain principles already stated, and introduce us to a new and important one.

Assuming the acceptance of a certain aim for a pupil's exercise of a given function, the selection, arrangement and presentation of subject matter, and the approval, criticism and amendment of the pupil's responses, are means of getting the pupil (1) to try to form certain bonds rather than others, (2) to form them in a certain order, (3) to identify more easily the bonds he is to try to form, (4) to be more satisfied at the right bond, and more unready to repeat

of five hours. The knowledge which would enable one to define the statement made in the text is lacking.

the wrong bonds, (5) to be more satisfied by the general exercise of the function, and (6) to be more satisfied by general improvement in it. . . .

One new principle is shown by the arrangement of subject matter as a condition of improvement, it being, of course, the principle of *order* or *sequence of bonds*. It might, perhaps as well have been listed among the psychological conditions, but is shown more clearly by the organization of textbooks and courses of study than by the procedures of learners left to themselves. . . .

The order of formation of bonds in the systematic training of schools is probably often pedantic and oversystematized; of the countless orders possible, many may be almost equally favorable to improvement; the order resulting from the unplanned trials and variations of a learner following inner impulses and outer suggestions with no guidance other than his previous learning and zeal to improve, may be more favorable to improvement than any which education has devised for the training of the function in question. These facts, however, do not contradict, but rather illustrate, the statement that the order of exercise of the particular bonds does condition improvement.

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# EXERCISES

1. Distinguish between learning and maturation.
2. What laws of learning are implicit in Aristotle's work?
3. Trace the development of association psychology indicating the contributions of the various associationists.
4. In what ways did the British associationists add to the original contribution of Aristotle?
5. Show similarities and differences between the Spencer-Bain-Baldwin theory of feeling and Thorndike's law of effect.
6. How do Thorndike's laws of learning resemble the principles of associationism? In what ways are they different?
7. What additions and modifications has Thorndike made to his original laws of learning?
8. Distinguish between associating and conditioning; associative shifting and the conditioned reflex.
9. Distinguish between individuation and integration.
10. How does the Gestalt theory of learning differ from the connectionist theory?
11. What basic similarities are there in all theories of learning?
12. What was the contribution of the following to experimental technique: Ebbinghaus, Thorndike, Köhler, Pavlov?
13. What are some of the neurological theories of learning? Why are they not satisfactory?
14. How might James's maxims be applied in breaking a habit or forming a new one? In what respect do they fall short?
15. Develop a list of suggestions on how to study and indicate ways in which those might be applied which you think would assist you in your study.
16. How can children best be taught right study habits?
17. For some one school subject indicate the factors and conditions of improvement applicable to the various aspects of learning in connection with that subject.
18. How would you find out what children actually do when they are learning to multiply or to spell?
19. How effective is mere repetition? What other factors are important in drill?
20. Compare the advantages of the more formal, standard type of school with those of the freer, newer type of school organization with respect to their effectiveness in encouraging learning.

## CHAPTER VII<sup>1</sup>

### ACQUISITION OF SKILLS

*Peter Sandiford, University of Toronto*

#### I. Introduction

No hard and fast line can be drawn between motor and mental learning; between motor and verbal skills; between muscular training and ideational learning. These two things are, as it were, descriptive terms for the extreme variants on a continuous scale. In man, motor skills frequently have verbal accompaniments, and verbal learnings are often worked out through his muscles. Yet the common-sense view of the man in the street, who makes a distinction between such activities as golf, juggling, typewriting, athletics or driving a motor car, and those which are involved in learning a poem, or studying geography and history, is undoubtedly a sound one. For the first group a person obviously uses his muscles and his body; for the second, he uses language and "his head." Consequently these two types of learning are frequently called motor and verbal learning and we compare and contrast the hand-minded with the bookish type of person.

There is, however, a considerable amount of overlapping. Typewriting is obviously a motor skill, yet just as obviously it is dependent upon a verbal knowledge of reading, spelling, punctuation and grammar. Golf is even more patently a motor skill. It is one that needs months of steady practice before even a modest score is achieved. Yet if we take lessons in the game from a professional we find that a large amount of verbal instruction enters into his teaching. "Keep your eye on the ball"; "don't raise your head"; "draw back the club slowly"; "follow through with your stroke," and so on, are the attempts to short-circuit the learning of this skill by means of verbal instructions. Similarly in learning to drive a motor car, to play billiards, to use chemical or physical apparatus in the laboratory, verbal instruction plays an important part.

Some motor or muscular skills are so simple that they seem to be little more than slightly modified reflexes; others are so complex that they involve the simultaneous operation and co-ordination of a large number of muscles. Learning to play the piano or the violin is a long and arduous business needing a large amount of concentrated attention before the muscles involved can be successfully co-ordinated.

In this chapter the common-sense view of motor learning has been taken. If most of the excerpts deal with the simpler skills, it is due to the fact that the reports of experimental findings are almost entirely concerned with such simple things. There is nothing in the literature, so far as I am aware, which reports in objective fashion how the skill of a Kreisler or a Paderewski is achieved. However,

<sup>1</sup> The readings in this chapter are useful supplements to all texts and in particular to the following: Griffith, *An Introduction to Educational Psychology*, Chapter II; Skinner and Collaborators, *Educational Psychology*, Chapter III; Trow, *Educational Psychology*, Chapter VII; Sandiford, *Educational Psychology*, Part II; Davis, *Psychology of Learning*, Chapter VI; Hollingworth, *Educational Psychology*, Chapter XIII; and Bagley, et al., *Human Behavior*, Chapter VIII.

the major problems confronting a student of motor learning have been illustrated. In a brief chapter this is all that can be done and must therefore suffice, but the student will get the greatest benefit from his study if, after reading these excerpts, he searches the literature to secure better examples for himself.

## II. Various Points of View of Habit Formation \*

### I. DUNLAP'S THEORY OF CATHARIS <sup>2</sup>

#### *Knight Dunlap*

Can we cure stammering through causing the patient to stammer voluntarily in as nearly as possible the same way in which he ordinarily stammers? Can we abolish tics through causing the tic to occur? If so, we should have a method of "catharsis" of enormous value, and the method should be applicable to a host of minor defects of response and conduct, as well as to such major troubles. . . .

The first opportunity which occurred for the testing of this method lay in an idiosyncrasy of my own in typewriting. For some years I have been annoyed, when typing rapidly, by an occasional transposition of the letters of a word, the word "the" being especially troublesome, so that in reading over a manuscript of my own typing I would sometimes find two, three or more of these transpositions into "hte." Several times I have attempted, by careful practice, to train myself out of the habit. The fact that in the majority of cases I actually wrote "the" exchanging it for "hte" only in a minority of cases and when typing rapidly, in itself indicates the futility of increased repetition of the "right" spelling. . . .

I now proceeded to try the typing of "hte" voluntarily, as a means of destroying it. I set to work deliberately and wrote about a half page, single spaced, of the "hte" combination, with the futuristic thought that this was a word that I would *not* write in the future (unless deliberately and voluntarily). Somewhat over a week later, I followed this with a second "practice period," writing less than a third of a page. This was over three months ago. Since that time I have typed many pages, some rapidly, but have not found on reading them over a single case of "hte." This may sound too easy to be true, but as a matter of fact a long-standing and troublesome habit has disappeared.

### 2. GESTALT "INSIGHT" <sup>3</sup>

#### *Wolfgang Köhler*

We can, from our own experience, distinguish sharply between the kind of conduct which from the very beginning arises out of a consideration of the

\*Only some of the viewpoints are presented in this chapter. The points of view of Thorndike and James were presented in Chapter VI.

<sup>2</sup>From Knight Dunlap, "A Revision of the Fundamental Law of Habit Formation." *Science*, 67, 1928, p. 361.

<sup>3</sup>From *The Mentality of Apes*, by Wolfgang Köhler. Copyright 1925. By permission of Harcourt, Brace and Company, Inc. Pp. 198-199.



characteristics of a situation, and one that does not. Only in the former case do we speak of insight, and only that behavior of animals definitely appears to us intelligent which takes account from the beginning of the lie of the land, and proceeds to deal with it in a smooth, continuous course. Hence follows this characteristic: *to set up as the criterion of insight, the appearance of a complete solution with reference to the whole lay-out of the field.* The contrast to the above theory (i.e., learning by chance trial and error) is absolute. . . .

*How one is to explain* that the field as a whole, the relations of the parts of the situation to one another, etc., determine the solution, belong to the theory. All we have to exclude here is the idea that the behavior of animals is to be explained by the theory, according to which the solution will be accomplished without regard to the structure of the situation, made up of chance parts as it is, that is to say, without intelligence.

### 3. CONDITIONING <sup>4</sup>

*E. R. Hilgard and A. A. Campbell*

Although the conditioned reflex was introduced into psychology chiefly as a method of experimentation with animals and as a substitute for introspection, it shortly assumed an important systematic position in relation to habit formation. In some cases the conditioned reflex was accepted as the unit of habit; in other cases the conditioning principle became a substitute for association. In spite of the systematic importance attached to the conditioned response by various writers, the detailed experimental analysis of conditioning as a learning process is relatively recent. Several experiments have attempted to chart the course of performance in order that the relationships between conditioning and other examples of acquired responses may be interpreted in the light of functionally established similarities. These have been well summarized by Hull.\*

The primary object of this investigation was to determine the stability of conditioned responses in man over periods of time. The similarity or dissimilarity between conditioning and familiar forms of learning hinges partly on the answer to the problem of retention. It is known that extinction is usually temporary, but evidence is meager regarding the permanence of the recovery which follows. Inasmuch as knowledge of original performance is essential to an understanding of retention, we have also studied certain aspects of the course of acquisition and extinction. The data to be reported, added to the evidence already in the literature, should serve to correct the erroneous belief that the results of conditioning are temporary and evanescent. . . .

<sup>4</sup>From E. R. Hilgard and A. A. Campbell, "The Course of Acquisition and Retention of Conditioned Eyelid Responses in Man." *Journal of Experimental Psychology*, 19, 1936, pp. 227-228; 245-246.

\*Hull, C. L., "Learning: II. The Factor of the Conditioned Reflex." In Murchison, C. (Ed.), *A Handbook of General Experimental Psychology*. Worcester, Mass.: Clark University Press, 1934, pp. 382-455.

Eyelid reactions were reported from fifty-one college students conditioned on two successive days and reconditioned after intervals of one week, four weeks, eight weeks, and twenty weeks, each subject serving at one interval.

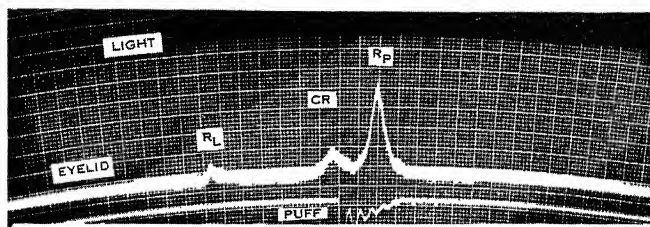


FIG. 12.—Specimen record illustrating original reflexes and the acquired conditioned response.

The record line, a shadow cast by an artificial paper eyelash (labelled "eyelid"), indicates three responses: a reflex to the light ( $R_L$ ), the conditioned response ( $CR$ ), and the reflex to the air-puff ( $R_P$ ). A rise in the line indicates lid closure. The onset of the light registers as a darkening at the top of the record, the air-puff as a break in the lower line. The curved abscissae are spaced at 1 mm. on the original record. Vertical time lines occur every .010 sec, with emphasized lines every .050 sec. The interval between the light and air-puff is .400 sec. The whole record represents about two seconds of time.

An illumination increase which elicited reflexes of small amplitude preceded by 0.4 sec. an air-puff to one cornea which evoked approximately complete lid closures. The conditioned response appeared as a lid reaction following the light by a latency greater than that of the reflex, but occurring before the onset of the air-puff.

TABLE I

CHARACTERISTICS OF REFLEXES AND CONDITIONED RESPONSES WITHIN REINFORCEMENT TRIALS ON TWO SUCCESSIVE DAYS OF CONDITIONING

(Averages from the records of 51 subjects)

Reinforcement Trials	Reflexes to Light (Conditioned Stimulus) Amp.-mm.	Reflexes to Air-puff (Unconditioned Stimulus) Amp.-mm.	Conditioned Responses	
			Amplitude mm.	Latency ms.
Day 1				
1-10	2.3	36.6	1.5	290
11-20	1.3	33.6	4.8	263
21-30	1.1	33.0	8.4	259
31-40	0.9	30.4	10.7	254
41-50	0.8	28.7	12.4	248
Day 2				
1-10	1.8	37.6	15.0	230
11-20	1.2	35.2	19.0	235
21-30	0.8	32.8	19.1	232
31-40	0.8	32.4	18.8	234
41-50	0.5	31.2	18.6	236

The course of acquisition of the conditioned response was studied on the basis of average amplitude within ten-trial series throughout conditioning. The acquisition curve is typically of S-form, positively accelerated at first, becoming negatively accelerated, and dropping off after a maximum point is reached. Subjects differ greatly in the duration of the phase of positive acceleration. The gradual development of the conditioned responses argues against their interpretation in terms of volitional or verbal processes.

Brief extinguishing series (ten trials of the light alone not followed by the air-puff) result in marked decrement.

Retention, as tested by a comparison of Day 3 values with those of Day 2, show a slight tendency for increased response over one-day values to eight weeks, and a slight decrease by twenty weeks. While the form of the curve of retention cannot be described reliably from these data, the results indicate unequivocally that conditioned responses may be retained at approximately full amplitude values for periods of time up to twenty weeks, the longest interval tested.

#### 4. ORGANISMIC LEARNING<sup>5</sup>

G. E. Coghill

From the facts related in the first lecture it is obvious that there are two processes that are operating simultaneously in the development of behavior. The one is expansion of the total pattern as a perfectly integrated unit; the other is the individuation of partial systems which eventually acquire more or less discreteness. In *Amblystoma*\* the total pattern first extends through the trunk and tail. As this pattern enlarges, the parts involved are always perfectly integrated. This totally integrated pattern then extends into the gills, next into the fore limbs and finally into the hind limbs. But as the totally integrated pattern expands through the organism, its parts, one after another, in the same order as they were invaded by the total pattern, begin to acquire a measure of individuality of their own; first the gills, then the fore limbs and finally the hind limbs. This means that local reflexes emerge as, in the language of "Gestalt," a "quality upon a ground," that is to say, they emerge as a special feature within a more diffuse but dominant mechanism of integration of the whole organism. They cannot be regarded as simply the action of a chain of neurons, excepting as every link of the chain is conceived to be welded into the organism as a whole.

This principle is thoroughly demonstrated for *Amblystoma*, a typical vertebrate, and there is nothing in our knowledge of the development of behavior to indicate that the principle does not prevail universally in vertebrates, including man. There is no direct evidence for the hypothesis that behavior, in so far as the form of the pattern is concerned, is simply a combination or coordination of reflexes. On the contrary, there is conclusive evidence of a domi-

<sup>5</sup> From G. E. Coghill, *Anatomy and the Problem of Behavior*. Cambridge: Cambridge University Press, 1928, pp. 88-89; 90-91; 109-110.

\* Salamander.

nant organic unity from the beginning. That evidence appears not only in the manner in which behavior develops, but particularly in the manner in which the nervous system puts the principle into effect, for, as shown in the first lecture, the nervous system concerns itself first with the maintenance of the integrity of the individual, and only later makes provision for local reflexes.

The development of behavior primarily through the extension of the total pattern, rather than through the projection of primarily isolated parts to become integrated secondarily, means that the maintenance of the integrity of the individual as a whole is the elementary function of the nervous system. This function is performed in *Amblystoma* through the growth of functional neurons into nascent organs. The same neurons, for example, that integrate the muscles of the trunk, while performing this function, grow into the limb by means of new branches long before the limb has power of movement. In like manner, the tissues of the tongue receive branches from motor neurons that are engaged in integrating the trunk long before the tongue has muscle tissue in it. It is therefore the potentiality of the functional neuron to grow in embryonic fashion that gives to the organism as a whole its ability to subjugate new parts and thereby maintain its unity during the development of behavior. Such growth of the already conducting neurons accomplishes, then, the primary function of the nervous system: the maintenance of the integrity of the individual while the behavior pattern expands. . . .

If, then, it is conceded that growth is one of the means by which the nervous system performs its function in behavior, it must be granted, contrary to the dogma of certain behaviorists, that man is more than the sum of his reflexes, instincts, and immediate reactions of all sorts. He is all these plus his creative potential for the future. Even the embryo of *Amblystoma* is, mechanistically considered, more than the sum of its reflexes or immediate behavior possibilities. The real measure of the individual, accordingly, whether lower animal or man, must include the element of growth as a creative power. Man is, indeed, a mechanism, but he is a mechanism which, within his limitations of life, sensitivity and growth, is creating and operating himself.

### III. Motivation in Motor Learning<sup>6</sup>

C. P. Stone

*Definition of terms.*—The term *motivation* in its most typical sense, is used in . . . animal psychology to denote a complex of dynamic factors by which an organism is aroused to perform specific reactions toward stimuli or objects of its environment. The external stimuli and the physiological states that serve to excite and, in a measure, to control the direction and persistence of responses are known, respectively, as (1) *incentives*, and (2) *internal needs* (i.e., *appetites* and *aversions*).

The term *drive* is more appropriately used to denote aroused tendencies in

<sup>6</sup> From C. P. Stone, "Motivation: Drives and Incentives in Motor Learning," in *Comparative Psychology*, F. A. Moss (Ed.). New York: Prentice-Hall, Inc., 1934, pp. 75-76; 109.

animals to respond to objects of their external environments that, in some measure, satisfy or alleviate a dominant physiological need. It is in the latter sense that we shall use the term.

*Ontogenetic aspects of motivation.*—Biological needs of the immature go considerably beyond those of the adult because the tissues of the immature, in addition to clamoring for maintenance, must be differentiated and their cells produced in mass as organogenesis and growth get under way. From the beginning of individual life, aggregates of cells, activated and regulated by internal controls, help themselves to nutrients in the fluid medium about them according to the kind and amount of their specific requirements, just as newborn and adult animals take nutrients from their external environments according to specific tastes and hunger rhythms. At one time the site of greatest demand may be in the head region, at another the mid-section, and, still later, the lower extremities. These incessant demands are met both *timely [sic]* and *adequately*. To make this possible, a vascular system develops and expands just when a rapid and flexible transporting system is required; distant tissues and organs are integrated and automatically controlled by neural mechanisms that mature very early; glands of internal secretion become functional just as their products are needed to stimulate and to regulate each other, as well as many other phases of organic development and maintenance; and finally, complex action systems involving the skeletal muscles become serviceable at the approach of each important physiological epoch, such as birth, weaning, dissemination of the family group, and sexual maturity—in short, just before any radical change in the organism's mode of living takes place.

Although such facts as we have just been considering may seem to pertain primarily to the province of physiology, they lie most certainly in a borderline field that the animal psychologist cannot afford to neglect. All of the unlearned responses are merely extensions of this early, more or less automatically developed system of physiological mechanisms by which the fundamental needs of an organism are supplied.

For purely methodological reasons, psychologists heretofore have centered their attention on problems of motivation as they arise in the more advanced stages of ontogenetic development. But now it is becoming more and more obvious that certain advantages may be gained if they endeavor to imbed the pillars of their subject in the prenatal (or equivalent) stages of life. By so doing, they may, for instance, be able to close an unwanted gap between motivation as it occurs in the prenatal and the postnatal course of development. . . .

*Generalized program for future investigations of motivation.*—Let us note once again that experimental studies of motivation are always conducted through the medium of animal responses. These responses are regarded as indicators of the presence of a physiological condition or state that is momentarily dominant. They are directed, as a rule, toward some object or stimulus pattern of the external environment that has an *interlocking* relationship

with the physiological state and when avoided or possessed by the organism satisfies, alleviates, dissipates, or otherwise alters this dominant physiological state. The common goal of experimental studies is delineation of characteristic modes of response, defining their direction with respect to objects or stimuli of the external world, measuring the vigor of action as indicated by duration and frequency of responses, or by work done in a given interval of time, and, finally, defining the dominant physiological states or needs that are fundamental to the actions and that in the last analysis are the *sine qua non* of motivation.

#### IV. Simple and Complex Forms of Motor Skills

##### I. THE SIMPLER FORMS <sup>7</sup>

*Joseph Peterson*

Swift's curves of learning to keep "two balls going with one hand, catching and throwing one while the other is in the air," do not show the rapid initial decline characteristic of most motor learning curves. On the contrary they are in general "concave toward the vertical axis, which means, of course, that the progress was at first slow and then more rapid." In Swift's curves vertical distances represent the average number of successful catches in ten trials, a day's practice; and the horizontal distances indicate the successive days, or the number of practice periods. By this method, as Thorndike has pointed out, equal distances on the abscissa line do not mean equal amounts of practice. A rearrangement of the data of one of Swift's subjects so that the horizontal distances will stand for equal number of tosses results in a curve which up to 4,500 tosses may be roughly represented by a straight line.

In animal and other experiments, in which errors are significant, as is true also of ball-tossing, curves of errors have been given along, usually, with curves of other data. Just what data to take as the most significant in any learning process, is a question that is not settled, and one that must obviously be answered differently for different learning processes. In most cases, even when time, errors, and performance are plotted in separate curves, the data are liable to be misleading if taken to represent the entire learning that goes on. If, for instance, one of the curves shows a plateau, we are too apt to conclude that learning was abated or wholly suspended at this point. This tendency is especially noticeable in cases of learning represented by a single curve.

The experiment here reported was devised to secure extensive data on ball-tossing in terms of errors, so that the results might be compared with those of other kinds of experimentation. The subjects in the experiments were sophomore, junior, and senior students taking their second half-year's

<sup>7</sup> From Joseph Peterson, "Experiments in Ball-Tossing: The Significance of Learning Curves." *Journal of Experimental Psychology*, 2, 1917, pp. 178-179; 223-224.

course in psychology. The experiment was performed in the spring of 1916. . . .

As a result of experiments on ball-tossing with twenty-eight subjects it has been found that the learning curves of ball-tossing are not different from learning curves of other processes, provided that similar kinds of data be compared. The error curve of ball-tossing, for example, has a rapid initial decline as have error curves—the usual “normal curve”—of various other types of learning. The curve of the average number of catches per trial, on the other hand, rises gradually at first, making almost a straight line, and more rapidly later. This gives it a concave aspect to the y-axis, as has been noted by Swift. Neither of these curves, however, is to be taken as exactly indicative of the relative rates of learning at different stages of the process. Other forms of plotting the results are possible, some of which would seem to suggest that learning is initially rapid and becomes slower as the process advances. Serious errors have resulted in the interpretation of learning from giving too much significance to the forms of any of these curves. On the whole, little evidence exists, so far as ball-tossing is concerned, for the current view that learning is at first much more rapid than later when considerable skill has been attained, this despite the form of the error curves. Error curves are found to be mathematically so related to curves of average attainment that the former must drop comparatively very rapidly at first while the latter change slowly, and, conversely, they must drop very slowly later while the average attainment curves rise rapidly. This is in ball-tossing. The changes described do not mean corresponding changes in *the learning*. There is good ground for the view that the same thing may be true of all learning curves. In general, it appears, curves of errors and of time (and of excess distance in the maze) will, because of this mathematical relation to attainment curves, always have a sudden initial drop. In cases showing a rapid initial rise of the average attainment curves it is probable that learning is initially more rapid, as has commonly been supposed, but the difference in the initial and the later rates is likely not as great as it has been thought to be. Even in such cases, and ball-tossing does not seem to be one of them—the evidence is questionable—the rapid initial progress may in many cases not be one of learning at all, but one resulting from the method of stating the results. The whole subject needs a careful experimental overhauling, and methods of making data from different experiments more comparable need to be worked out. A tentative procedure is suggested in the present paper, and a few applications are given as illustrative, but only roughly, due to the incompleteness of reported data by various authors.

The basis on which our present views of plateaus and of the approaches to physiological zero rest is insecure. It is found that whether or not a plateau appears and the degree of its occurrence depend much on the type of curve chosen to represent it. If, for instance, it occurs late in the learning process it may be almost wholly obscured in the error of the time curve. This may be one reason why error and time curves so seldom show plateaus. When

the proper conversion of data is made before comparisons there seems to be little ground for the distinction frequently made between sensory discrimination learning and motor learning in animal behavior. The difference is likely mainly one of the method of calling out the reaction and of stating the score; the learning in both cases can be so stated as to make the two processes quite comparable.

## 2. MORE COMPLEX MOTOR SKILLS<sup>8</sup>

*W. L. Bryan and N. Harter*

Throughout the year of exploration, operators were questioned closely with regard to the rate of improvement with practice at various periods. Operators generally agreed upon certain main facts. Upon the basis of this general inquiry and of his own personal experience as an operator and a teacher of telegraphy, H. drew the curves represented in Fig. II, Plate I [not reproduced here], as a rough picture of the facts.

In further verification of the main characteristics of these curves, over two hundred operators, ranging in skill from the most expert to those just beginning, have been questioned and have given practically unanimous assent. . . .

Ordinary telegraphic speed is reckoned in terms of so many words per minute. For these tests, however, the letters were counted. Of course sentences were used in each test which had not been used before. Pains were taken to keep the tests of uniform difficulty. On the one hand, many short and easy combinations, and on the other hand, combinations representing unusual difficulty from a telegraphic point of view were avoided. Special pains were also taken to see that the amount of practice from week to week was substantially uniform.

The sending test was made as follows: The learner was directed to write as fast as he could do so, legibly. The observer copied the words as sent as a test of legibility. Some two minute period was noted by the observer, unknown to learner, and the number of letters sent in that time was afterward counted. Several tests were taken and the results averaged. The variation in the several tests was slight. The receiving test was made as follows: The observer would try a rate of sending which he judged would correspond to the learner's capacity. The learner was required to name the letters, later on the words, or, when he had more skill, to copy without naming them. If he failed to interpret correctly at that rate, a slower rate was tried. If he succeeded, a more rapid rate was tried. A two minute period was noted and the letters were counted as above. . . .

*Significance of the practice curves.*—Certain main facts appear in all the foregoing curves:

<sup>8</sup>From W. L. Bryan and N. Harter, "Studies in the Physiology and Psychology of the Telegraphic Language." *Psychological Review*, 4, 1897, pp. 45-46; 47-52; and 6, 1899, pp. 357-358; 360-361; 369-370; 375.



(1) The sending curve rises more rapidly and more uniformly than does the receiving curve from the beginning of practice to the learner's maximum ability.

(2) The receiving curve rises more slowly and irregularly. All the results agree in showing a long, flat curve for several months before the slowest main line rate is reached; and all the evidence before us indicates another long flat curve a little above the rate necessary for the transaction of ordinary office business, in the case of operators to whom that amount of skill in receiving is sufficient. A study of the quantitative results shown in figures IX and X [not reproduced here] shows that there are many short flat places in the receiving curve followed by relatively rapid improvement.

(3) Two of the curves show a fact which usually appears at a period of the learner's development later than that shown in these curves, namely, that the receiving rate finally exceeds the sending rate. This is almost the universal rule. A receiving operator with a typewriter can practically take his ease in taking the most rapid presswork.

(4) In considering the reasons for the remarkable differences between the receiving and sending curves, the following points may be noticed: (a) The language which comes to the ear of the learner seems to him far more complex than the language which he has to write. When he wishes to *write* the letter *e*, he must have in mind only the making of one quick snap with his hand. When he *hears* the letter *e*, he hears two sounds, the down stroke and the back stroke, and must take note of the time between them to distinguish the dot from the dash. If we take the more difficult combinations, as *k* (— — —), or *j* (— — —), the greater complexity of the sound picture with its irregularly occurring back stroke is sufficiently evident.

(b) The opportunity for practicing receiving at slow rates is evidently far less than for sending at such rates. It is always possible for the learner to do his slow best at sending, but he must depend upon others for a chance to receive at a rate within his capacity. It is of course true that he hears all that he himself sends, but it is a significant fact that the hearing of his own writing does not improve his power to receive in anything like the same degree that the hearing of other operators' writing does. As the curves show, young operators can, at a certain period, send with fair rapidity for a long period during which they cannot understand a single sentence on the main line. (c) A further significant fact is that learners *enjoy* the practice of sending, but feel practice in receiving to be painful and fatiguing drudgery. For this reason they naturally incline to practice sending a great deal, but must summon up all their resolution to keep up the necessary practice in receiving. (d) A fact which seems to be highly significant is that years of daily practice in receiving at ordinary rates will not bring a man to his own maximum ability to receive. The proof of this fact is that men whose receiving curve has been upon a level for years frequently rise to a far higher rate when forced to do so in order to secure and hold a position requiring the higher skill. That daily practice in receiving will not assure improvement

is further seen in the fact that in many cases inferior operators after being tolerated for years are finally dropped because they do not get far enough above the dead line. (e) One conclusion seems to stand out from all these facts more clearly than anything else, namely, that in learning to interpret the telegraphic language *it is intense effort which educates*. This seems to be true throughout the whole length of the curve. Every step in advance seems to cost as much as the former. Indeed, each new step seems to cost more than the former. Inquiry at the telegraph schools and among operators indicates that between 60 and 75 per cent of those who begin the study of telegraphy become discouraged upon the plateau of the curve just below the main line rate. As a rule, ordinary operators will not make the painful effort necessary to become experts. Facts of an analogous character will be recalled from other fields.

The physiological, psychological, and pedagogical implications of this conclusion are manifestly important. If in our educational methods in the past, we have often made the pace that kills, there is possibly the danger on the other hand that we shall make schoolwork all play, and so eliminate the intense effort which is necessary for progress.

(5) The sending curve conforms approximately to the well-known typical practice curve with the important difference from the curves usually obtained in the laboratory that it extends over a much greater period of time. The difference characterizes the whole curve. If we represent the practice curve by the general equation

$$y = f(x)$$

it is evident that the function of  $x$  contains a constant which depends upon the unit of time. So, for example, the curve given in the figure would present exactly the same appearance if the same results had been obtained in forty successive hours or forty successive years. Comparison of different practice curves shows that this time factor varies greatly in the development of different abilities. A comparative study of this characteristic of various practice curves would have evident theoretical and practical value.

(6) The receiving curve presents many profound interests and difficulties. It is a quantitative study of apperception. It represents with a high degree of accuracy the increasing power which practice brings to interpret a language. The task of the mind is not in every respect analogous to that involved in listening to foreign speech, for in the telegraphic language, after a short time, every element is recognized by the learner if he is given time, whereas in the foreign speech he may frequently be disturbed by words that are entirely unknown. We have, however, gained the impression, partly from personal experience and partly from conversation with teachers of language and others who have learned foreign languages, that the curve of practice in learning a language must present at least great general similarities to the receiving curves here shown. All agree that just below the ability to understand what is spoken, there is a long, discouraging plateau where many give up in despair; that there is at last a sudden ascent into the ability to understand

most of what is said; finally that the perfect mastery of one at home in the language comes much later and only after very persistent work. Of those who undertake the study of any foreign language, most stop on the first plateau below a working proficiency; and of those who go on, most stop on the second plateau, below complete mastery.

(7) What is the interpretation of the plateaus in the receiving curve? . . .

A plateau in the curve means that the lower-order habits are approaching their maximum development, but are not yet sufficiently automatic to leave the attention free to attack the higher-order habits. The length of the plateau is a measure of the difficulty of making the lower-order habits sufficiently automatic.

(a) *The first ascent*.—No plateau appears between the learning of letters and of words, because very soon these are learned simultaneously. However, as the letters are few, one is each week able to give more complete attention to the mastery of syllables and words as wholes. This perhaps accounts, in part, for the rapid progress of the first weeks.

(b) *The first plateau*.—For several months the learner is compelled to attend almost exclusively to words. The number of words which he has to learn in order to receive whatever messages come, is great. The average amount of practice which each word receives is therefore small, and the increase in the average rate of receiving correspondingly slow. This very slow increase of rate we have called a plateau. It continues until the learner has the necessary vocabulary so well learned that he can have his attention free for something else.

Another retarding influence during this period is doubtless the learner's slight hold upon the higher language habits. The importance of this retarding influence, in comparison with that of an imperfect vocabulary, cannot be determined without additional investigation.

(c) The second ascent represents the acquisition of a new set of language habits. This is a priori probable from the consideration that in practice curves generally rapid progress appears when the developing function is in an early stage. We are not, however, left with a probability. While the receiving curve is rising rapidly the synchronous word and letter curves are continuing their ascent slowly. We therefore know that the learner is gaining speed by taking in some way increasing advantage of word combinations. Part of the reason why he improves so fast is, doubtless, that he has already been unconsciously habituated for certain phrases and forms of a word combination in the period when he was attending mainly to words. It may be that the rapid ascent of any practice curve represents mainly a quick realization of powers potentially present by reason of preceding gradual and unconscious habituation. With the increased ability in taking sentences there comes, without doubt, increased ability to take isolated words and letters; but, as one improves, the three curves diverge more and more. This means that skill depends more and more upon the acquisition of higher language habits. . . .

In the foregoing we have given little more than a bare statement of

results. In the discussion of these results, we desire, first of all, to give the plain meaning of the facts known to us. We shall, however, use entire freedom in suggesting a wider circle of interpretations for which the evidence is not made out. We have, however, no interest in any theory suggested, except to see it tried by facts and assigned its proper measure of probability.

A man is organized in spots—or rather in some spots far more than in others. This is true structurally and functionally. It is strikingly true of the various sense organs and their functions. [It is] no less [true] of the various parts of the central nervous system and their functions. A man has some habits which are sporadic and isolated, some which are bunched together in loose groups (such as the outlay of skill which make one a carpenter), and then some habits which are knit together into a hierarchy.

A hierarchy of habits may be described in this way: (1) There are a certain number of habits which are elementary constituents of all the other habits within the hierarchy. (2) There are habits of a higher order which, embracing the lower as elements, are themselves in turn elements of higher habits, and so on. (3) A habit of any order, when thoroughly acquired, has physiological and, if conscious, psychological unity. The habits of lower order which are its elements tend to lose themselves in it, and it tends to lose itself in habits of higher order when it appears as an element therein.

There is reason to believe that proficiency in chess, geometry, chemistry, and the like, involves in each case the mastery of habits which are associated in some such hierarchical fashion. . . .

Similar principles hold in arithmetic. It is a mistake to demand of children a thorough memorizing of the number series and of the fundamental tables before giving them any exercise with concrete numbers and problems. It is a greater mistake to spend the years when the plastic memory is at its best in number exercises which are interesting, but which leave the children with the alphabets of arithmetic imperfectly mastered. The high school boy who must halt in his mathematical work to remember the multiplication table is enjoying the fruits of a pseudo freedom in the grades. *There is no freedom except through automatism.* It is possible to avoid both the extremes mentioned. The work should be filled with concrete interest in ways fully displayed in our modern elementary textbooks on arithmetic. But at all times the teacher should see to it that there is thorough incidental practice of those number relations which should become automatic, and at some times there should be direct hard work at memorizing those relations.

In addition to the evidence already presented in favor of the foregoing view, two general considerations are submitted.

(1) It is quite useless to raise the question whether or not children should acquire specific automatic habits. There is no escape from such habits except by death. The Indian does not escape. The wolf does not escape. Neither Shakespeare nor Caliban escape. There is no question of escaping automatic habits. The only real question is: Which ones shall we acquire? The school and civilization answer: While it is possible acquire those habits which are

the alphabets of learning and of cultivated life. This is the first necessary step toward the freedom, adaptability, ingenuity, and efficiency which gives superiority to man.

(2) A school method must be judged by the moods and tempers which it cultivates, not simply by what is learned, still less by the momentary interest it arouses. If one forces mastery of the multiplication table by methods which keep one-half the school cowed and the other half rebellious, one has obtained a useful result at disastrous cost. Better not know the multiplication table than be thus morally maimed.

If on the other hand, one anxiously converts all schoolwork into a round of entertainments, if one shields the pupils from having at any time a sense of resolute effort with hard tasks, if one keeps the pupils vibrating between excitement and ennui as at a circus or picnic, what of the moods and tempers thus cultivated? To what set of character do they lead? For what occupation do they prepare? Everyone knows. These are the moods and tempers of the loafer, the tramp, the sport—the idlers, rich and poor, who afflict society with their inefficiency and consequent misery. . . .

He can, if he chooses, deal accurately with minute details. He can swiftly overlook great areas with an accurate sense of what the details involved amount to—indeed, with far greater justice to details than is possible for one who knows nothing else. Finally, his whole array of habits is swiftly obedient to serve in the solution of new problems. Automatism is not genius, but it is the hands and feet of genius.

## V. Some Factors Which Affect Motor Learning

### I. MATURATION AND MOTOR LEARNING<sup>9</sup>

*Myrtle B. McGraw*

While we have not in this investigation been able to ascertain the definition of these rhythms and spurts of development, our findings, though tentative, suggest that the following phases or alterations can be expected in the growth of any behavior pattern, despite the complexity of the activity or the structural level at which it is controlled.

(1) Since we made observations only on overt manifestations of behavior, the initial phase in the development of a particular behavior course would be that period just prior to the first emergence of a somatic movement indicating the appearance of the growing action pattern. Whatever may be the nature of the growth prior to the overt manifestation of the action, it would have to be analyzed through some other method than direct observation. It is, for example, conceivable that a growth is in progress which will later make it possible for the baby to respond overtly to a bell held before his face, but the nature of the development cannot be observed in the actions of the newborn infant. This is true because there is a period following birth when

<sup>9</sup> From Myrtle B. McGraw, *Growth: A Study of Johnny and Jimmy*. New York: D. Appleton-Century Company, 1935, pp. 306-308.

his movements have no perceptible reference to objects within the visual field. The initial phase in the development of an activity is that period which occurs just prior to the first identifiable movements of the behavior pattern.

(2) The second phase is indicated by the first somatic movement which can be recognized as a developing aspect of the behavior course. This movement is inchoate [*sic*] and ephemeral and is coupled with, if not obscured by, diffuse general activities. It can be observed only infrequently, and then it is not carried through to completion.

(3) Little by little this partial, incomplete movement can be seen to become more definite and expansive. In fact it often becomes so expansive as to appear excessive or exaggerated. There is a tendency to overwork a newly developing activity. This tendency to exaggeration is expressed both in time and in extent of the movement. As the child begins to get control over a pattern or an aspect of a pattern, the activity itself becomes the incentive for repetition.

(4) In due process of growth, however, the exaggeration of this particular movement becomes checked or inhibited by the emergence of another movement. The conflict of the two is likely to evoke greater diffuse activity for a time, but gradually the second movement reaches the period of rapid development until it too becomes overemphasized, often to the extent of being excessive. Often the second aspect or movement develops so rapidly that it temporarily excludes the earlier one. Ultimately the excess activity is eliminated until the movement becomes restricted to its most specific and economical form—usually somewhere between the two extremes. We so often think of growth as an expansion or accumulation of something. In reality elimination and regression are as essential to development as accumulation and expansion.

(5) Once a pattern or an aspect of a pattern has attained a certain degree of fixity or definiteness it may unite or integrate with another aspect of the pattern or another action pattern in order to form a new, more complex behavior pattern. The process of development may therefore be quite different when the behavior pattern is in different stages of maturation. At an early phase the process may be a matter of eliminating excess motion, growth progressive from a general diffuse state to one of greater specificity, whereas in the later stages of development the process may be primarily that of constructing patterns of greater complexity. Within a given individual both processes are going on at all times, since different action patterns are in different stages of development.

## 2. AGE AND MOTOR LEARNING<sup>10</sup>

*E. L. Thorndike*

Learning to swim, skate, and dance may be taken as fair samples of learning in athletics. Age is evidently not an insuperable barrier, learning

<sup>10</sup> From E. L. Thorndike, *et al.*, *Adult Learning*, 1928, pp. 111; 112; 112-113; 124. By permission of The Macmillan Company.

to swim and dance occurring at all ages to fifty. The influence of interest and custom is seen in the fact that swimming is learned late, especially by the women, while dancing is learned late, especially by the men. There is an enormous majority of opinion (seventy-one to nine) that these athletic

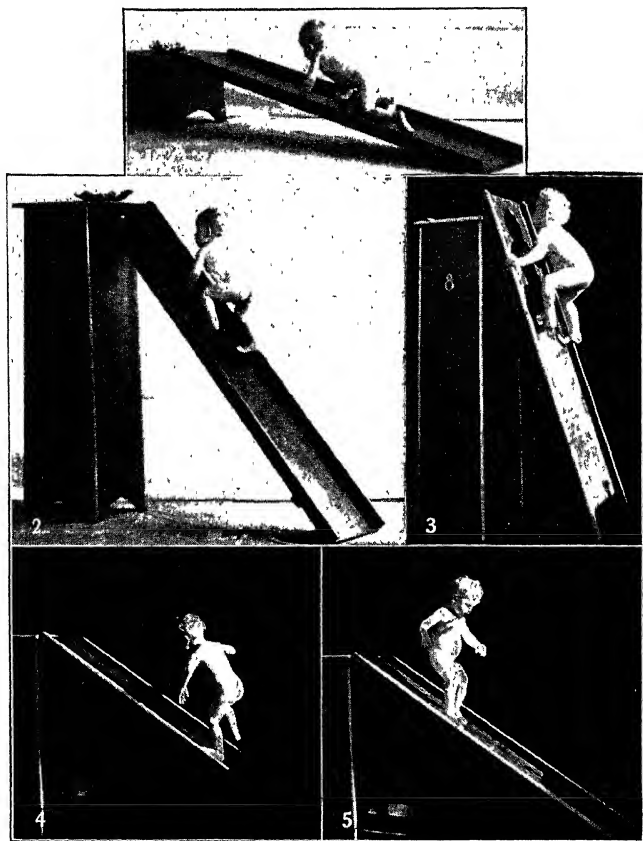


FIG. 13.—*Behavior on Slides (Johnny)*. 1. Johnny begins ascending a slide placed at an angle of  $11^{\circ}$  when eight and one-half months old. 2. At ten months he ascends a slide placed at an angle of  $48^{\circ}$ . 3. At twenty-one months he scales a  $70^{\circ}$  slope. 4 and 5. Johnny at thirteen months walks up and down an incline of  $32^{\circ}$ . (This and the following figure are from McGraw, *Growth*. Courtesy of D. Appleton-Century Company.)

skills would be harder to learn at the late ages over forty than they were at the earlier. The majority is not so strong in those of thirty to thirty-nine (sixty-six to thirty-three). . . .

Learning to drive an automobile, sail a boat, ride horseback, and ride a bicycle are fair samples of semiathletic and semitechnical skills. They also

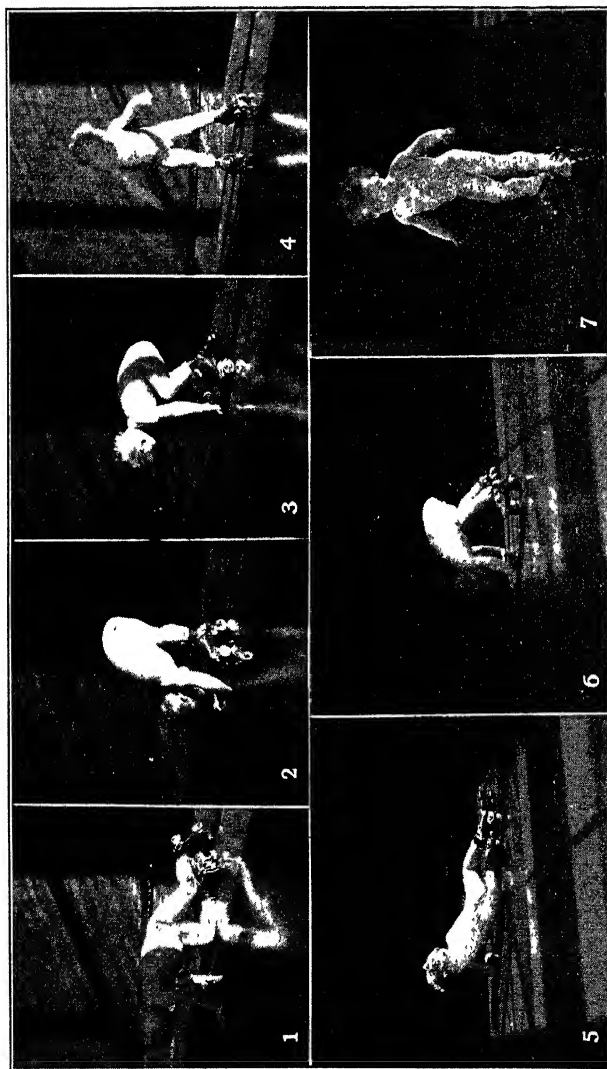


FIG. 14.—*Skating*. 1, 2, 3. Johnny at twenty-one months in the assumption of an erect position when on skates. 4. Johnny has developed a rhythmical skating movement. 5 and 6. Jimmy at twenty-six months in the assumption of an erect posture on skates. 7. Jimmy uses his right foot as a pusher.



show a very wide age range. There is a large, but not overwhelming majority (sixty-one to twenty-one) of the opinion that these skills would be harder to acquire after forty than when they were acquired. For the group aged thirty to thirty-nine, the vote is fifty-nine to forty-three. . . .

Learning to play the piano and to typewrite are two common samples of a complex system of sensorimotor skills. The former is, in general and especially in its higher possibilities, much the harder. There is a wide range of dates for typewriting. Learning to play the piano is, as was stated earlier, distinctly an achievement of childhood, not probably because of any limitations, in adolescent and adult years, to the abilities required. There is a strong majority of the opinion that these accomplishments would be harder to learn at the present ages than at the ages when they were learned, a majority about the same as in the case of driving an auto, sailing a boat, riding a horse and riding a bicycle. . . .

In general the testimony of this group indicates (1) that almost anything is learnable at any time up to fifty, (2) that the experience of these individuals leads them to expect more difficulty in learning from forty on than from thirty to thirty-nine, except with making and breaking food habits, (3) that the difficulty expected from thirty up to forty is no greater than for childhood or adolescent years in the case of intellectual acquisition pure and simple, and (4) that, in general, age seems to them to influence the power of intellectual acquisition very much less than it influences motor skill. There is evidence also that (5) the difficulty expected in learning at late ages is in part due to a sensitiveness to ridicule, adverse comment, and undesired attention, so that if it were customary for mature and old people to learn to swim and ride bicycles and speak German, the difficulty might diminish.

### 3. REWARDS AND PUNISHMENTS<sup>11</sup>

*R. W. Gilbert and L. W. Crafts*

The aims of this experiment were (1) to determine the effect upon the learning and retention of a stylus maze of giving an auditory signal for error during the learning, and (2) to compare the effect of the above signal with that of administering an electric shock for error, which we have reported in a previous study. The auditory signal, it should be said at once, was a combined buzz and click produced, respectively, by a Porter inductorium and an electric counter whenever [subject] touched the end of a cul-de-sac with the stylus. . . .

To return now to the question of how the facilitating effect of the sound upon the learning is to be explained: Was the sound a guide? The only possible answer is, yes. It had an informative value. It literally *announced* to S just where the blind alleys were, whereas in its absence much explora-

<sup>11</sup> From R. W. Gilbert and L. W. Crafts, "The Effect of Signal for Error upon Maze Learning and Retention." *Journal of Experimental Psychology*, 18, 1935, pp. 121; 126; 127; 128-129; 132.

tion was often necessary to assure him that he really was in a cul-de-sac. Hence, it made the discrimination of the true path much more easy. . . .

Was the sound an incentive? It may have been to some degree for all S's; it certainly had this function for a few. According to Leuba any stimulus is an incentive in so far as it arouses or augments the incentive attitude, which he terms a "source of energy" leading to movements which are faster, more vigorous, more persistent, and more uniformly relevant to the task at hand. In the present instance the sound did tend, as we have seen, to bring about quicker retreats from blind alleys, and also did of course greatly improve the accuracy of response. . . .

In answer, then, to the original question as to how the facilitating effect of the signal for error upon learning is to be explained, we would conclude that this effect was due to the sound's possessing not one but three functions; namely, those of a guide, of a punishment, and of an incentive. This conclusion does not, however, require the presumption that it had all of these functions at all times for every S; its incentive aspect in particular can perhaps not be so universally assumed. Furthermore no evidence is available on the basis of which the relative contribution of these various functions to the acceleration of the learning can be ascertained.

It is, we think, worth suggesting at this point that psychologists sometimes err in the direction of oversimplification when they treat a stimulus to which many varied functions could be attributed as if, in their experiments at least, it had exerted only one type of influence. Tolman's limiting the significance of his sound and shock signals to an emphasizing, guiding one seems to us to be a case in point. Thorndike also, in his recent experimental and theoretical contributions, has consistently regarded the words "right" and "wrong" as rewards and punishments influencing selection only through their satisfying and annoying effects, and has failed to suggest any other function for them. There is of course no reason to deny that these verbal stimuli do act as rewards and punishments; but there is also no reason why absorption in this aspect of their influence should wholly exclude any recognition of the fact that they may be looked upon as being both guides and incentives as well.

Thorndike has also committed himself to the view that satisfiers are far more "universal, inevitable, and direct" in their effect on learning than annoyers are, this conclusion devolving mainly from the fact that in his experiments the word "right" produced the selection of the correct responses whereas the word "wrong" did little or nothing to eliminate the incorrect ones. And while he admits that annoying consequences may under certain circumstances have considerable educative value, he does in general minimize their influence very greatly. Furthermore, since his verbal rewards and punishments may also be regarded as guides, or even as incentives, his conclusions if accepted would likewise tend to raise serious doubts as to the value for learning of all information of error on the one hand and the whole range of negative incentives on the other. In the present experiment, however, it

seems clear that a stimulus which, as we have seen, may be variously looked upon as a punishment, a guide to error, or a negative incentive, did facilitate learning. The denial to such stimuli of any selective value whatsoever is therefore, as Thorndike himself admits, at present quite unjustified. . . .

*Summary.*—The aims of the experiment were to determine the effect upon the learning and the retention of a stylus maze of giving an auditory signal—specifically a buzzer sound and a click—for error during the learning, and also to compare these results with those of a previous study in which an electric shock had been similarly administered. The S's were one hundred college students divided into two groups of twenty-five men and twenty-five women each. Both groups learned the McGeoch-Melton medium maze to the criterion of two of three successive trials without error. In the experimental group every contact of the stylus with the end of a cul-de-sac produced the above sound. After an interval of one week the maze was relearned to the same criterion as before, but without sound for either group. The results were: In learning, the experimental group was markedly superior to the control according to the usual three criteria of trials, errors, and time. In retention it was equal in per cent saved, but superior in recall, in relearning, and in per cent saved per trial, . . . Its superiority in learning was attributed to the unquestionable guidance or informative value of the auditory signal, together with the punishment and incentive functions which it probably also possessed. Comparison of the signal and the shock groups showed the value of sound and shock for both learning and retention to have been approximately equal. The guidance value of these two stimuli may be considered identical, and perhaps the disturbing effect of the shock on some S's counter-balanced its presumably greater significance as an incentive and as a punishment.

#### 4. THE PHYSIOLOGICAL LIMITS OF LEARNING<sup>12</sup>

*Peter Sandiford*

The student P. N. made a record of seventy words a minute after three hundred and sixty hours of typewriting practice. This is a high degree of skill, but compared with the record (about two hundred words per minute in a ten-minute test after ten words have been deducted for each error) it is almost negligible. Will P. N. ever reach two hundred words per minute? The chances are heavily against him, for few are born with nervous and muscular mechanisms which will enable them to make such high records. Will P. N. by sound methods of practice and concentrated effort be able to reach records higher than seventy words a minute? The probabilities are that he will, but it is impossible to say what the limit of his achievement will be. This can only be learned from actual experience. But just as some people are born to be good musicians, some to be relatively poor ones, so some are born with high potential abilities in typewriting and some with low.

<sup>12</sup> From Peter Sandiford, *Educational Psychology*. New York: Longmans, Green & Co., 1928, pp. 217-220.

There is a *physiological* or *theoretical limit* set by nature for every skill and capacity possessed by any individual.

The physiological limits can easily be comprehended in the case of skills. It is easily seen that no person can type three hundred words a minute or run one hundred yards in six seconds. But physiological limits in knowledge seem to belong to a different category. Persons who freely admit the limitation of possibilities in regard to skill deny it vigorously in regard to knowledge. But there are theoretical limitations to knowledge as well as to skill. The chief argument in favor of a theoretical limit is the one which says: If there are no limits to learning, then, given the opportunity, anybody can learn anything. But all known facts are against this doctrine. As a matter of fact only about one-third of the pupils now in school could, under the most favorable of circumstances, acquire sufficient knowledge to pass the B.A. examination of an average North American University. Yet no one would claim that this standard of knowledge is unduly high.

Several factors confuse the issue. The first is that the physiological limit may be approached but never reached. Learning may be compared with the summation of the series  $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ , etc., which approaches but never reaches unity. Any given function may be improved by zealous practice, but perfection can never be achieved. This *practical limit* of learning may approach the *physiological limit*, yet the two never coincide. But the person who can type two hundred words a minute, run one hundred yards in 9.6 seconds, average bogey for a season's golf, break ninety-nine clay pigeons out of one hundred shot at, score three thousand runs in a season's cricket, make sixty home runs in a summer, play the piano like a Paderewski, the violin like a Kreisler, or sing like a Galli-Curci, has reached a practical limit in each of these activities which closely approximates the theoretical. Ordinarily, however, the distance between the two limits is considerable; most functions can easily be improved by practice. The writer's present skill in adding numbers is mediocre. After a spell of work on statistics it noticeably improves, while there is no doubt that if he had to gain a living as a bank clerk or chartered accountant it would reach a still higher limit.

Most of our powers are exercised on a comparatively low plane. The reasons for this are obvious. We are each endowed with so many hereditary powers that we cannot find time to develop more than the merest fraction of them. The very multitude of possible connections among our billions of neurons precludes us from reaching the hereditary limits in anything more complex than the simplest of functions. The majority of us have never studied Chinese, but we could learn it if we had to. Intensive practice of simple functions causes the practical limit to approach the physiological one, but in more complex ones the theoretical limit is approached with greater difficulty.

A second factor, which disturbs the issue, is the confusion between amount of a function and its rarity. We ordinarily think of Shakespeare [as] being several thousand times better than the average hack writer. But when the amounts can be accurately measured the rates are found to be much

smaller. An average typist can type about one-third as well as an expert one; and he is a poor golfer indeed who takes twice as many strokes for a round as the national champion. Expertness is rare and we value it highly, but in terms of measured amount it is not greatly superior to mediocrity. We may be quite willing to pay the president of a bank very highly for his services, but he is probably not much more expert in banking than the average of his clerks.

Thirdly, the law of diminishing returns applies to so many of our habits. The upper limits of learning are reached only at the cost of much time and effort. In other words, the practice curve in its upper reaches tends towards a zero slope. Moreover, the higher the skill, the sooner it is lost through disuse; the upper slopes of the practice curve are very slippery. Hence the penalty for success is more effort. The famous preacher cannot afford to preach a sermon from a barrel, and the virtuoso musician is forced to practice his eight hours a day in order to maintain his high reputation with the musical public.

Lastly, because of the tendency for a nervous discharge to take the path that it has taken before, we find our hereditary and habitual patterns standing in the way of new learning. Uneconomical ways of doing things become stamped in our natures, and it is only by careful and assiduous practice that these may be overcome. For these reasons, the practical limits of learning lie much below the theoretical, but this should never be interpreted to mean that the theoretical ones have no existence.

### 5. OVERLEARNING MOTOR SKILLS<sup>18</sup>

*W. C. F. Krueger*

A previous study indicated that a certain degree of overlearning, up to 50 per cent, was highly economical from the standpoint of retention for intervals of two to twenty-eight days, and that the larger the interval, the greater . . . was the economy. Further increases of overlearning, however, proved to be uneconomical for most intervals. These results did not agree with Luh's. In his experiments and in mine the subjects memorized such ideational material as lists of nouns and nonsense syllables. In the present experiments the subjects acquired an act of skill, mastering a kinesthetic (or finger) maze. . . .

Retention was measured in three ways. (1) The use of the usual formula for the "saving method" gave one set of retention scores. (2) Subtracting the time required for relearning the maze from the time necessary for learning the maze to the 100 per cent degree stage gave another set of scores. The time consumed during the overlearning was never included in the minuend. Thus the differences in relearning time for the three degrees of learning were thought of as indicators of the effect of additional learning or practice.

<sup>18</sup> From W. C. F. Krueger, "Further Studies in Overlearning," *Journal of Experimental Psychology*, 13, 1930, pp. 152-153; 153-154; 159-160; 163.

(3) Subtracting the number of errors made during learning the maze to the 100 per cent degree of mastery gave the third set of scores. . . .

*Conclusions.*—As the degree of learning was increased from 100 per cent to 150 per cent, there was always an increase in all retention scores for all intervals, and this proportional increase was always less than 50 per cent. There was no consistent proportional increase or decrease of retention as the interval was varied.

As the degree of learning was increased from 150 per cent to 200 per cent (or by an additional third), the corresponding increase in retention scores usually was more than a third, especially for the longer intervals. But no consistent relationship between the proportional increase in retention and the length of the interval was found.

The results substantiated our previous discovery that overlearning, when within the range of our experiment, is not detrimental, but economical. In fact, the increase from the 150 per cent degree of learning to the 200 per cent degree was proportionally more economical than the increase from the 100 per cent degree to the 150 per cent degree.

The results of the foregoing experiment suggested that the study be extended to note the effect of a still higher degree of learning, namely 200 per cent overlearning. . . .

[This extended experiment showed that] the higher degree of overlearning always has the higher average retention scores for each interval.

The respective increase in retention score is not very large, although consistent.

The increase from 100 per cent overlearning to 200 per cent overlearning is not as economical as 50 per cent and 100 per cent overlearning.

There is no consistent variation between increase in retention and the length of interval.

## VI. Economical Methods of Securing Motor Skills<sup>14</sup>

*C. J. Warden*

It has been quite generally assumed that the reactions normally evoked in the process of learning a stylus maze are very largely of the characteristic motor type. In fact the maze has come to be considered the standard apparatus, perhaps, in present laboratory practice, for the study of trial-and-error motor learning, and especially so in connection with comparative studies. Here the results obtained upon an animal maze are compared directly with those obtained with human subjects upon a stylus maze of similar or identical design. The fundamental assumption seems to be that the human subject in the stylus maze situation must build up a reaction pattern largely in terms of muscular control, in much the same manner as the animal is known to do in maze learning. . . .

<sup>14</sup> From C. J. Warden, "The Relative Economy of Various Modes of Attack in the Mastery of a Stylus Maze." *Journal of Experimental Psychology*, 7, 1924, pp. 243; 244-245; 246-247; 248-249; 249-250.

The present study is an attempt to analyze the various modes of attack adopted by subjects who were wholly unbiased and naïve as to the methods that may be employed, and who therefore were left to "hit upon" such modes of reaction as each was able to do, in mastering the situation. In this way it was hoped to determine the extent to which the maze is a typical motor problem in the sense indicated in the opening paragraph. . . .

Particular attention is called to the fact that in no case was information concerning either the nature of the task or the manner of its performance given verbally to the subject. Upon first entering the room each subject was handed a sheet of typed instructions giving a brief general description of a stylus maze situation, the starting and stopping signals, a few precautions concerning the proper method of holding the stylus, and other similar information. The problem itself was stated to be, "learning to go from the entrance to the goal without making any false turns into blind alleys, for three trials out of four in succession."

The subject was informed at the bottom of the page not to ask questions of the experimenter, to read the instructions over at least twice, and to indicate when he was ready to begin. In a few cases the subject did ask the experimenter "just how he should go about it to learn," etc., but such questions were always answered by the experimenter merely by a typically Continental shrug of the shoulders. Each subject approached the problem, therefore, with exactly the same opportunity of informing himself as to the nature of the situation, and the manner of meeting it was left entirely to his own ingenuity.

This rigid technique, in which not a single word concerning the task was uttered by the experimenter in the presence of the subject previous to the learning, makes it impossible that the results obtained are in any measure due to suggestion or immediate laboratory atmosphere. Inasmuch as it was the intention to determine whether or not any relation exists between the intelligence scores of the subjects and the mode of attack that they might "hit upon" in learning the maze, the importance of the technique concerned with the preconditions of learning can hardly be overemphasized.

After the problem had been mastered the subject was handed a sheet of paper on which had been typed a brief description of the three following methods of learning, with instructions to check their use, in the order of their importance, in the present situation: word reaction method, visual imagery method, motor method. He was also instructed to describe, in blank spaces provided, any method or methods which he may have used that seemed to him to be different from either of the three listed. This was the first intimation given the subject that the experimenter was in any way interested in the manner of his attack in learning the maze.

After the questionnaire had been checked, the subject was questioned verbally by the experimenter as to precisely what he had meant by indicating that he had used this, that, or the other method in learning. He was also required to describe or illustrate the operation of the method or methods as applied to his own case. Occasionally the subject decided that he had

made an error in checking the questionnaire, in which case he was allowed to make a correction. The error arose, of course, from the fact that the descriptions of the different methods on the questionnaire had not been adequate in such cases. . . .

In the first column of Table II is presented the number of subjects who, left entirely to themselves, in some manner hit upon and adopted each of the three modes of attack. The percentages covering the same item appear in the second column.

TABLE II  
RELATIVE ECONOMY OF VARIOUS MODES OF ATTACK

<i>Mode of Attack</i>	<i>Number of Subjects</i>	<i>Per Cent of Total Number</i>	<i>Trials Required to Learn</i>	
			Mean	Range
Word reaction	25	41.7	32.2	16-62
Visual imagery	18	30.0	67.9	41-104
Motor reaction	17	28.3	123.9	72-195

It was a matter of some surprise to the writer to find that so small a number of the subjects should use primarily the motor method, the actual number being somewhat less than 30 per cent of the entire group. A slightly larger percentage reported an attempted visualization of the pattern, while approximately 42 per cent, reduced the spatial situation to a verbal scheme of some sort and memorized the verbal series.

It ought to be mentioned in this connection, perhaps, that the majority of the subjects reported the use of more than a single method, and that the values given in the above table are based upon the method primarily used. When a second method was reported it was definitely assigned to a place of lesser importance by the subject, and meant merely that at some time during the learning this subsidiary mode of attack had been tried out but later rejected and replaced by the primary method. The method upon which the above classification is based was always, therefore, the one that finally brought success. . . .

If the comparisons presented in the first two columns of Table II may be taken as typical of stylus maze learning in general, it is apparent that the characteristic motor reaction is not called out by the stylus maze situation in any but a small minority of individuals, and even many of these may depend in part upon other than motor cues. And if this be true, then the validity of the common practice of making direct comparisons between the data of stylus maze learning, on the one hand, and the animal maze learning upon the other, may very properly be called in question. At any rate such a comparison should not involve the assumption that the mode of attack and the type of response are similar in the two cases. For it appears that the human subject as the usual thing utilizes short-cut methods that are not included in the animal's repertoire of response, such as "attempts to visualize" and verbalization. The animal must depend upon sensorimotor cues. The



large percentage of subjects making use of verbalization of some sort in the present experiment suggests that stylus maze learning may be more a matter of arranging a series of words into a definite order and then fixating them, than of moving the arm about under motor control.

## VII. Retention of Motor Skills <sup>15</sup>

*Peter Sandiford*

Why is it that dancing, swimming, skating, and bicycle-riding once learned are so permanent, while languages, history, and knowledge in general are so fugitive? The probable explanation is, first, that in the former activities certain native connections are largely drawn upon. The motions of swimming, dancing, skating and bicycle-riding are not very far removed from movements that are perfectly natural to all of us. Secondly, each movement is overlearned to an enormous extent. The striking-out movement in skating must be performed hundreds of thousands of times by Canadian youths during a normal winter. On the contrary, language and all knowledge which has language as its basis, has to be "acquired" to a much greater extent than dancing or skating; there is less of a native basis for it, as it were. Further, the multiplicity of bonds in the language activities precludes the overlearning of any of them. In the anatomy course of the University of Toronto, it has been computed [that] the medical student has to learn five thousand new technical terms during his second year. How many of these can become overlearned? The same number of new words in a foreign language would certainly provide anybody with a good working vocabulary.

The difference between the two sets of functions can be illustrated from the personal experience of the writer. Like most boys living in England in 1895, he learned to skate during the seven weeks of continuous frost which occurred at that time. A succession of mild winters prevented him from skating again until he came to Canada in 1913. The interval of eighteen years had caused some lapse in learning, yet to all intents and purposes he began his skating in 1913 at the stage where he left off in 1895. But Danish, a language he learned to a fair extent during a two-months' sojourn in Denmark in 1906, seems almost to have disappeared completely. He cannot, for example, count up to ten in Danish, though he has been trying hard to do it during the past two or three minutes. That the language has not altogether disappeared, but has left some traces behind, would be shown by the greater ease of relearning it in comparison with the first learning.

## VIII. Is There a General Motor Ability? <sup>16</sup>

*R. H. Seashore*

The problem raised here is an important one. The average layman firmly believes that there are persons who are hand-minded, or generally athletic, or generally

<sup>15</sup> From Peter Sandiford, *op. cit.*, pp. 240-241.

<sup>16</sup> From R. H. Seashore, "Individual Differences in Motor Skills." *Journal of General Psychology*, 3, 1930, pp. 58-59; 62.

skilled in games, and so on. There is some support for this view in that reaction times tend to be general. Conditionings, however, seem to be specific. The factor analysis techniques developed by Thurstone, Kelley, Hotelling, and Spearman seem to show that a general factor, which may be termed "mechanical ability," really exists. Dr. Seashore tested out the theory of general motor ability and arrived at the following conclusion.

In consideration of the results on simple and complex motor tests, the following statement seems to the writer to be the most conservative evaluation of the principles involved in personnel treatment: Any motor test is a *sampling* of behavior measured on the *assumption* that this series of measurements will represent in some degree what the individual will do on similar performances later on, with the *further possible assumption* that (1) (aptitude) the measurement is not a "miniature performance" of the skill itself, but some more basic co-ordination common to this and many other complex skills; or (2) (miniature performance) that the measurement is a sampling of more or less independent skills, on the theory that if a person has acquired these samples it is probable that his antecedents have been such that he has acquired others to about the same degree.

This statement does not depend on the specific or general nature of motor skills, nor on the relative influence of nature or nurture, nor does it claim that the same type of results should be expected from testing different ages and ranges of individuals. As such, it is only a formulation of the general bases for the prediction of motor skills, and, to be useful, certain modifications must be made. . . .

In the populations of college students which have been tested, the interrelations of individual differences on motor tests do not seem to justify the assumption of a general motor ability. . . .

The independence of the skills measured in these tests argues against any theory of general motor ability and in favor of specific skills. The results of related studies have so far presented little evidence that serial performances may be analyzed into speed or accuracy of simple reactions or reflexes.

The theory by which motor skills are determined by a relatively small number of basic motor capacities is strongly open to question. The independence of these performances as measured suggests that if there are basic motor capacities, they are more numerous and more specific than previously believed.

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## EXERCISES

1. Is there such an individual as the "hand-minded" child, or the person who shows a "general" motor skill? Give the evidence both for and against the theory of specific motor skills, and defend the position you take.
2. Defend or refute the statement that "all human behavior is merely some aspect of movement."
3. Do all learning curves exhibit plateaus? If plateaus occur, what is the reason for their occurrence?
4. Are there physiological or theoretical limits to verbal or ideational learning? How do the limits of motor learning differ from those of verbal learning?
5. What is Sandiford's view with regard to the retention of motor skills?
6. In what respects may motivation in motor learnings be regarded as a form of maturation? Discuss the factor of maturation in learning.
7. Compare and summarize the various points of view in regard to the place of automatism as a factor in motor learning.
8. What part does verbalization play in the motor learning of human beings? Since rats cannot verbalize, is it fair to assume that the findings of maze runnings of rats are directly transferable to the solution of the problem of human learning?
9. Cite the evidence for and against the theory that "in motor learning the method of wholes is superior to the method of parts."
10. Suppose you had one hundred and twenty hours in which to teach children of about twelve years of age to typewrite. What length and distribution of practice periods would you select?
11. How much inferior on the average are middle-aged adults to adolescents in their late teens in the learning of motor skills (e.g., playing the piano)?
12. What evidence is there to support the contention that women are superior to men in the learning of motor skills in which fine discrimination and delicate muscular co-ordination are needed?
13. Is overlearning a skill detrimental or economical? Can limits be usefully set to the degree of overlearning?

## CHAPTER VIII <sup>1</sup>

### ACQUISITION OF KNOWLEDGE

*Stephen M. Corey, The University of Wisconsin*

#### I. Introduction

The psychological literature is replete with references to many allegedly different types of learning—trial and error, modification of innate tendencies, perceptual, motor, ideational, sensorimotor, and learning by insight. This list is neither exhaustive nor particularly enlightening. The present chapter is not an attempt to develop a new classification. Instead it represents an effort to bring together readings pertinent to the learning of meaningful verbal materials such as are dealt with in school situations.

The editor's desire to confine his selection of readings to investigations of the learning of meaningful verbal materials has imposed a decided limitation upon the number of references available. Many of the classical learning papers have dealt with nonsense syllables. None of this type has been included in the present chapter because of the conviction that school learning should have as little in common as possible with the memorization of meaningless materials. Recently there has been a noticeable increase in the number of field studies of learning—investigations involving school children in real learning situations. The obstacles that must be faced in experimental work of this sort render conclusions less reliable, but as compensation there is the happy feeling that the research may help in the solution of tangible educational problems.

#### II. General

##### I. HOW WE LEARN <sup>2</sup>

*Edward Lee Thorndike*

(1) The mere repetition of a situation does not cause adaptive learning. If a certain state of affairs acts upon a man a thousand times, he will respond no better the last ten times than the first, unless other forces than the mere repetition of that situation or state of affairs are brought into play. Some psychologists and educators have assumed that with repeated occurrences of a situation, to which various responses were made, the more frequent of these responses would wax at the expense of the less frequent, so that in

<sup>1</sup> These excerpts supplement the chapters on this subject in the following books: Griffith, *An Introduction to Educational Psychology*, Chapter III; Skinner and Collaborators, *Educational Psychology*, Chapter III; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter XI; Davis, *Psychology of Learning*, Chapter III; Fletcher, *Psychology in Education*, Chapter XII; and Bagley, *et al.*, *Human Behavior*, Chapter IX.

<sup>2</sup> From Edward Lee Thorndike, "How We Learn." *Journal of Adult Education*, 6, 1934, No. 1, pp. 47-51.

the end the response which was most frequent at the beginning would become the exclusive one. Nothing of the sort happens.

(2) If, instead of just causing some situation to occur repeatedly, the teacher causes a *connection*, i.e., some situation *and some one response to it*, to occur repeatedly, what will be the result? If the connection is merely temporal, if the response does not "belong" to the situation, but simply comes after it, there is almost no influence on learning. Merely putting things in the mind in sequence is likely to be futile as a means of getting one to evoke the other later.

(3) If the teacher causes some situation and a response felt as belonging to it to occur together, but with no aftereffect, the learner being absolutely indifferent, neither pleased nor displeased by making the response which he does make, what will be the result upon learning? Psychologists have differed widely in their expectations from such repetition of a connection, with belonging but without reward. The actual fact is that repetitive drill of this sort does cause learning, but so slowly that for all practical purposes it is very inferior to repetition plus a satisfying aftereffect of some kind.

(4) Certain phenomena observed in experiments on repetition suggested that making the first member of a pair more impressive not only caused it to be learned, but also caused the bond linking the second member of the pair to the first to be strengthened. For example, suppose that you wish to learn that *amo* means I love. If you hear or say "*amo amo amo*, I love" you will not only remember *amo* better (than if you had just said "*amo*, I love"), but also that it means "I love." Indeed, "*amo, amo, amo*, I love" will teach you that better than "*amo*, I love, I love, I love" will. This latter is especially remarkable since what you were trying to learn was to think of "I love" for *amo*, so that repeating "I love" would be expected to be far more useful than repeating *amo*.

(5) The consequence or aftereffect of a mental connection can and does work back upon it to strengthen or weaken it. The facts prove that a satisfying aftereffect which belongs to a connection works back upon it to strengthen it, and does so directly, universally, and, in a sense, inevitably.

A satisfying aftereffect arouses what we may call a confirming reaction which makes the animal more likely to continue or repeat the response then and there if the situation persists, and more likely to repeat the response later if the situation vanishes then but recurs later. This confirming reaction is the main cause of learning.

(6) The influence of a punishment, i.e., an annoying aftereffect, upon the connection to which it belongs and of which it is the aftereffect is not the opposite of the influence of a reward, i.e., a satisfying aftereffect. It does not directly, universally, and inevitably weaken the mental connection to which it is attached.

The influence of a reward or of a punishment depends upon what it leads the person to do. The reward tends to arouse the confirming reaction and so to cause the continuance or repetition of the connection; the punishment does not necessarily tend to arouse a tendency to discontinue the punished connec-

tion or repeat it less often, or actuate an opposite connection, or all other available connections than it. It arouses whatever behavior original nature or past experience has linked to that particular annoying aftereffect in those particular circumstances. This may be to run away, to scream, or to perform other useless acts. Punishments are then very unreliable forces in learning. They can be trusted fully only in the cases where the punishment of the wrong behavior leads the person to engage in the right behavior, which is then rewarded. In such cases the reward really does the work.

(7) Connections are easy to form in proportion as the situation is identifiable, and distinguishable from others. The identification or placement of a situation, or part of a situation, is often the first response to it, whereby it is recognized, or tagged, or pigeonholed, or otherwise individualized and made a *terminus a quo*.

Much of learning consists in changes in the identifiability of situations. Their identifiability may be increased by analysis which turns them into compounds or complexes of features which are easier to grasp and retain than the original situations. We can thus easily learn differential reactions to, say, a hexagon and an octagon of equal areas, by first identifying them by counting the sides. It may be increased by association, which connects them more or less unambiguously with something that is more easily identifiable than the situations themselves.

There are two notable special varieties of such improved identifiability by analysis and association.

First, elements of situations which are hard to identify because they are hidden qualities or features are analyzed out into relief, are made identifiable by having attention directed specially to them and by the action of varying concomitants and contrast. The results are of very great importance for learning, especially the learning of man. Times, numbers, lengths, volumes, weights, colors, mass, density, force, heat, light, molecules, atoms, nouns, verbs, and the like have to be made thus identifiable before we can profitably learn facts about them.

Second, situations which are hard to identify because they are varying amounts or degrees of some one quality like length, area, weight, brightness, temperature, health, intelligence, and the like are identified by the aid of measurement with scales, crude or refined.

(8) Consider now the principle of availability or get-at-ableness of the response. Other things being equal, connections are easy to form in proportion as the response is available, summonable, such that the person can have it or make it at will. Much of learning consists in making certain responses more available, more easily summonable.

The principles of identifiability and availability are of great importance in education, mental hygiene, and all forms of human engineering. Much of the learning of the sciences consists in making identifiable the facts and ideas corresponding to 3, 4, 5, ratio, root, parabola, atom, potential, hydrogen,

chromosome, gene, price, enzyme, situation, response, connection, I.Q., negative adaptation, apraxia, and similar words.

The task of teaching at all age levels is to put together in the mind what should go together, and to make these connections satisfying. The facts, skills, and abilities which are suitable to be taught to adults often differ from those suitable for children, but the general procedure by which any information, skill or power is developed does not. What will interest and satisfy adults differs, of course, in important ways from what will interest and satisfy children or adolescents, but the general process by which a satisfying aftereffect confirms the behavior that produces it does not. The general laws of human modifiability do not change with age. Procedures that are fundamentally sound (or unsound) in learning and teaching at age 10 or 20 will be so at age 30 or 40 or 50.

## 2. DIFFERENCES BETWEEN GOOD AND POOR STUDENTS<sup>3</sup>

*Luella Cole Pressey*

It was found desirable, in the total effort for information regarding effective study methods and related factors affecting academic success, to obtain somewhat more extensive data about certain topics than was possible by individual methods of inquiry. On the basis of previous work a somewhat elaborate series of questions was therefore formulated, revised, finally cut to a total of 125 objective answer questions, and given to some 250 students in classes in elementary psychology. The nature of the questions will be indicated shortly. Marks of these students for the entire previous quarter's work were also obtained, and the papers arranged in order of the average scholastic standing for the previous quarter. Elimination of students who had not been in school the previous quarter, or for whom the data were otherwise incomplete, reduced the total number dealt with in this study to exactly 200. The papers of the 50 students making the highest marks and the 50 making the lowest were then selected for intensive study in an effort to determine what was distinctive of the good group as compared with the poor. The statistical procedure was simple. Most of the questions were answered simply by yes or no. For each question the per cent of good students answering "Yes" was found, and the per cent of poor students so answering; the difference between these figures then served as a rough indication of the importance of the factor to which the question referred, in conditioning academic success.

The following list includes only those questions showing a difference of 20 per cent or more between the good and poor students. The per cent given for each question is in each case the per cent by which the poor group exceeded the good group (thus the figure after the first question of Section B shows that 36 per cent more of the poor students than of the good did not usually study every day in the same place); the effort was to find the distinc-

<sup>3</sup> From Luella Cole Pressey, "What Are the Crucial Differences between Good and Poor Students?" *Research Adventures in University Teaching*. Bloomington: Public School Publishing Company, 1927, pp. 4-10.

TABLE III

	Answer	Per Cent
A. Physical Condition.		
1. Are you usually tired when you get up in the morning?	Yes	36
2. Do you have any chronic complaint that prevents you from doing your best work?	Yes	24
B. Study Environment and General Routine of Study.		
1. Do you usually study every day in the same place?	No	36
2. Do you have a daily plan of work?	No	24
3. Do you usually know in the morning just how you are going to spend your day?	No	24
4. Does your desk have anything on it that might distract your mind from work?	Yes	20
5. Are study hours observed where you live?	No	20
C. Reading.		
1. Do you frequently skip the graphs or tables in your textbooks?	Yes	40
2. Do you frequently make simple charts or diagrams to represent points in your reading?	No	40
3. When you find a word in your reading that you do not know do you usually look it up in the dictionary?	No	32
4. Do you usually skim over a chapter before reading it in detail?	No	28
5. Do you usually have trouble in getting the meaning of a chart or table?	Yes	28
6. Do you usually glance through a chapter looking at the paragraph headings before reading it in detail?	No	24
7. Do you usually read the summary at the end of a chapter before reading the chapter?	No	20
8. When you memorize something do you usually do it all at one sitting?	Yes	20
D. Note Taking.		
1. Do you keep your notes from one subject together?	No	32
2. Do you usually take your notes in class just as rapidly as you can write?	Yes	32
3. Do you usually take your notes in lecture in outline form?	No	28
4. Do you usually take your notes on reading in outline form?	No	28
5. Do you usually summarize your readings in a sentence or short paragraph?	No	24
6. After you have read a chapter and taken notes on it do you usually write a summary of the chapter as a whole?	No	24
E. Self Expression.		
1. Do you usually have difficulty in expressing yourself in written work?	Yes	56
2. Do your teachers frequently complain that you do not make sentences when you write?	Yes	28
3. Do you usually have difficulty in making complete sentences when you write?	Yes	28
F. Examinations and Reviews.		
1. Do you sit up late the night before an exam studying?	Yes	40
2. Do you often write the answer to a question only to find that it is the answer to some other question on the examination?	Yes	32
3. In preparing for an examination do you try to memorize the text?	Yes	28
4. If a teacher gives an examination without warning do you usually fail it?	Yes	24
G. General Attitudes.		
1. Do you frequently try to analyze your work and find out just where you are weak?	No	36
2. Do you frequently use the facts learned in one course to help you in the work of some other course?	No	28

The above table is essentially self-explanatory; no detailed comments seem necessary.



tive weakness of the poor students. The questions have been grouped under various main heads, so that their significance may be more easily grasped; within each section the items are arranged in order of distinctiveness.

### III. Adaptation of Learning to Individual Differences

#### INDIVIDUAL VS. GROUP INSTRUCTION <sup>4</sup>

*Paul C. Warner and Walter S. Guiler*

The purpose of this investigation was to discover the relative merits of individual and group instruction in grammatical usage. The experiment was carried on with ninth and tenth grade pupils in the Greenville (Ohio) High School. On the basis of scores derived from giving the Otis Self-administering Test of Mental Ability, Higher Examination, Form B and the Guiler-Henry Preliminary Diagnostic Test in Grammatical Usage to three hundred sixty pupils in the grades mentioned above, three equivalent groups of one hundred pupils each were formed.

The three groups were equated by matching each pupil selected for one group with a pupil of like intelligence and grammatical usage ability for each of the other two groups. Each group thus selected consisted of fifty-eight ninth grade pupils and forty-two tenth grade pupils. For convenience of later discussion, these groups will be hereafter referred to as (a) the experimental group, (b) the control group, and (c) the check group.

The experiment extended over twelve class periods of fifty-five minutes each. In the control classes neither the pupils nor their teachers were conscious of the particular principles of grammatical usage in which individual pupils were weak. Both the teachers and pupils of the experimental and control classes had been told, however, that a retest in grammatical usage would be given at the close of the experiment in order to measure improvement. Hence, as a defense measure, the teachers of the control classes felt it necessary to instruct all the pupils in all of the forty-five principles of grammatical usage included in the pupil's workbooks.

In the experimental classes, the learning situation was entirely different from the one which obtained in the control classes. Both the teachers and pupils of the experimental classes were fully aware of the particular principles of grammatical usage, in the application of which each learner had encountered difficulty in the preliminary test.

In order to obtain an objective measure of the amount of improvement that had taken place, the three hundred pupils comprising the experimental, control, and check groups were tested at the close of the twelve periods of study by means of the Guiler-Henry Retest in Grammatical Usage. The retest was the equivalent of the preliminary test in content and in difficulty.

The results of the experiment are presented in the following table, which records on the basis of test scores the amount of improvement that was made.

<sup>4</sup>From Paul C. Warner and Walter S. Guiler, "Individual Vs. Group Instruction in Grammatical Usage" *Journal of Educational Psychology*, 24, No. 2, 1933, pp. 140-151.

The average scores attained by the experimental group, the control group, and the check group on the initial test are given in the first column. The second column shows the average score made by each of the three groups on the final test. The third column gives the average increase in point score for each group from initial to final test. The last column shows the percentage of improvement made by each group. In computing the percentage of improvement made by each group, the actual gain in point score of the final over the initial test was divided by the possible gain in point scores.

TABLE IV  
AVERAGE SCORES MADE BY THE DIFFERENT PUPIL GROUPS ON INITIAL AND FINAL TESTS \*

	(1)	(2)	(3)	(4)
	<i>Average Score on Initial Test</i>	<i>Average Score on Final Test</i>	<i>Average Increase in Point Score of Final Over Initial Test</i>	<i>Percentage † of Improve- ment</i>
Ninth grade pupils				
Experimental group . . . .	25.6	46.6	21.0	29.4
Control group . . . . .	24.9	39.1	14.1	19.6
Check group . . . . .	25.3	29.8	4.5	6.3
Tenth grade pupils				
Experimental group . . . .	36.2	58.3	22.1	36.4
Control group . . . . .	37.1	50.8	13.7	22.8
Check group . . . . .	36.6	39.7	3.1	5.2
Both grades				
Experimental group . . . .	30.1	51.5	21.4	32.1
Control group . . . . .	30.1	44.0	13.9	20.8
Check group . . . . .	30.0	33.9	3.9	5.9

\* All averages were computed from the test scores.

† Percentage of improvement was computed by dividing the actual gain in point score by the possible gain in point score.

*Conclusion.*—Individual instruction based on individual diagnosis was found to be much more effective than mass instruction in the remediation of shortcomings in grammatical usage. This statement is based on an analysis of (a) test scores, (b) principles of grammatical usage in which difficulty was encountered, and (c) error quotients.

#### IV. Recitations in Learning

##### I. THE RELATIVE VALUE OF GROUPED AND INTERSPERSED RECITATIONS <sup>5</sup>

*E. B. Skaggs*

The purpose of the following work is to throw some light if possible upon this question; granting the superiority of L's plus R's (throughout we will

<sup>5</sup> From E. B. Skaggs, "The Relative Value of Grouped and Interspersed Recitations." *Journal of Experimental Psychology*, 3, No. 6, 1920, pp. 424-446.

let L stand for reading and R for recitation) over mere L's, is it better to intersperse L and R or use some degree of grouping? Put in more practical form we might state the question thus: Is it better for the student to read through his English-German vocabulary, poem or what not, and then try to recall, or should he read two or more times and then try to recall two or more times? In other words shall he intersperse or group?

Eight-line stanzas of poetry were selected (Byron's *Don Juan*). The L's and R's were used in the strict sense, no promptings being used whatever in the recitations. An L means that the subject read through the stanza from beginning to end with concentrated attention, while an R means an attempted recall without any prompting.

Thirty-six persons acted as subjects, all but two undergraduate students taking elementary psychology. Nineteen of the subjects were men and seventeen were women.

Four methods were used here, each method involving two preliminary but unrecorded readings. The methods were:

- I. L R L R L R, etc., until learned.
- II. LL RR LL RR, etc., until learned.
- III. LLL RRR LLL RRR, etc., until learned.
- IV. LLL RRR LL RR L R L R, etc., until learned.

As can be seen, Method I is the truly interspersed method, II more grouped, and III the most grouped. Method IV is a mixed method involving III, II, and I in order and continuing with Method I as indicated above, until learned.

The average number of L's, L's and R's, and time is given in the following table. The general averages probably give truer results than any method of comparing by using absolute individual standings.

TABLE V

SHOWING COMBINED RESULTS FOR ALL METHODS FOR NINETEEN MEN AND SEVENTEEN WOMEN

	METHOD I			METHOD II		
	<i>L's</i>	<i>LR's</i>	<i>Time</i>	<i>L's</i>	<i>LR's</i>	<i>Time</i>
Total . . . .	310.35	621.45	504.49	349.32	678.75	582.59
Av. . . . .	8.62	16.98	14.41	9.92	19.39	14.64
M.V. . . . .	2.65	2.45	3.61	3.05	6.09	3.83

	METHOD III			METHOD IV		
	<i>L's</i>	<i>LR's</i>	<i>Time</i>	<i>L's</i>	<i>LR's</i>	<i>Time</i>
Total . . . . .	380.40	735.10	449.12	276.27	586.52	470.58
Av. . . . .	10.56	20.41	12.83	8.12	17.25	14.26
M.V. . . . .	3.28	6.38	3.71	2.51	4.94	4.27

An inspection of the table shows that, with regard to number of readings required to learn the stanza, Method I (the interspersed) is best of the three. Method II is next best and Method III takes most readings. If we consider Method IV (the mixed method) also, then it stands first. The above is true for the averages of the men and women taken separately as well as for their combined averages.

*Summary.*—Using sense material and comparing the three methods used (the interspersed, the slightly grouped, and the more grouped methods) we find that,

- (1) as regards the number of readings and recitations, the interspersed method is the best, the slightly grouped second best, and the more grouped method least efficient;
- (2) as regards the time required to learn, while there is very little difference, the grouped method is best, on the whole.

Considering all four methods, we find that as regards readings and recitations the mixed method is best. As regards time, however, it is not so good as Method III.

*Explanation.*—The “mixed method” probably derives one advantage from the fact that there are more readings to start with. However, as it utilizes all three other methods, but Method I most, and inasmuch as Method I is most efficient in comparison to Method II and III it seems reasonable to think that Method IV gets its second advantage through involving the interspersed method.

The question still unsettled is as to how many preliminary readings one should make before introducing the interspersed method of reading recitation. Gates has answered this question probably better than any one else so far, but the optimum preliminary readings will vary according to the length of the material, its difficulty and organization. Certainly introduction of the recitations too early does not favor the interspersed method of reading-recitation.

## 2. SUMMARY STATEMENT OF THE EFFECTIVENESS OF RECITATIONS IN LEARNING <sup>6</sup>

*E. B. Skaggs, S. Grossman, Louise Krueger and W. C. F. Krueger*

*Facts fairly well established.*—(1) In the case of adults most of the experimental evidence indicates that the introduction of some degree of reading-recitation or “attempted” recall is more efficient than mere reading.

(2) The same situation appears to be true in the case of children. However, due to less rigid control of conditions, the results cannot be so reliable as in the case of trained adult subjects.

(3) The value of reading-recitation differs according to the nature of the material which is learned. The evidence indicates that reading-recitation is

<sup>6</sup> From E. B. Skaggs, S. Grossman, Louise Krueger, and Wm. C. F. Krueger, “Further Studies of the Reading-Recitation Process in Learning.” *Archives of Psychology*, 18, 114, 1930, pp. 35-36.

most effective with relatively senseless or disconnected material and least economical for sense or connected material.

(4) If by recitation is meant a mere attempt to recall or reconstruct the material without including any prompting or reading, then interspersed recitations are more effective than any method of grouping.

(5) There is always an optimal time for introducing the combined reading-recitation process. A certain number of preliminary pure readings are always necessary. For relatively short materials, meaningful or meaningless, the optimal number of preliminary readings seems to lie between four and eight, with an average of six.

(6) A pure reading, even under the best controlled conditions and in the case of highly trained subjects, is the exception rather than the rule, after the first few preliminary readings. All subjects tend to test themselves to some extent and in various ways.

(7) Analysis indicates that the attention factor functions best during the reading-recitation process.

*Some important unsettled questions.*—(1) Little is known of the relative value of reading-recitation when lengthy materials are used. The present and past work has been concerned with relatively short sense and nonsense materials.

(2) Different methods of testing efficiency may yield varying results. Several methods of testing efficiency should be used and compared.

(3) The problem of relative amounts retained after long intervals needs further investigation. Most of the experimental work has dealt with immediate or early recall.

(4) The time spent in "searching" or trying to "anticipate" the next learning element in a series before actually getting the perceptual cue is an interesting and very important question. Too much time may be spent in vain searching. It is evident that some of that effort directed to reading-recitation would bring about more economical learning.

(5) Another problem is the relation of the efficiency of the reading-recitation process to the imagery type of the individual.

(6) The method of presentation may have considerable bearing upon the problem of reading in relation to reading-recitation. Little information is at hand on this matter.

(7) There is some evidence that continuous reading without interspersing a recall or a reading-recitation will not increase retention after an optimal number of pure readings.

(8) The time allotted for reading an element in a series may determine the optimal point at which the most economical recall or reading-recitation should be inserted.

V. An Evaluation of Certain Incentives Used in School Work<sup>7</sup>*Elizabeth B. Hurlock*

The problem stated briefly is this: In a classroom, do the children who constantly receive praise for their work show more improvement from day to day than do the children who are reprovved or who are completely ignored?

The 106 children used in this study were from the classes of Grades IV and VI of the Cameron Public School Building of Harrisburg, Pennsylvania. The tests used to measure the rate of improvement under the different conditions of practice were modifications, made by the writer, of the Courtis Research Tests in arithmetic, addition form. Each test contained thirty examples of equal difficulty, each of which was made up of six three-place numbers. Fifteen minute periods were allowed each day for the practice. A different test was used on each of the five days.

On the first day of the experiment, all of the children within each grade were given the addition test together. On the basis of these results, four equivalent groups were formed, to be known throughout the experiment as the Control, Praised, Reprovved, and Ignored Groups. These groups were equal not only in initial ability as displayed on these tests in addition, but also in average age and number of boys and girls within each group. The Control Group, after the first test, was separated from the others, and was given the tests on the four remaining days in a separate room. No comment was made to them. They were merely asked to add the examples on the paper given to them at the beginning of the period. The other three groups took these tests together, but under different conditions of incentive. Each day, before the test papers were given out, the names of the children of the Praised Group were called out by the experimenter, and the children were asked to rise, come to the front of the room and face the class. They were then praised for the excellency of their work of the preceding day, as shown both in the improvement made and the general superiority over the other members of the group. They were encouraged to do better, to try to avoid any careless mistakes, and to add as many problems as the time permitted. Following this, the members of the Reprovved Group were called out and were severely reprovved for poor work, careless mistakes, lack of improvement over the preceding day's work, and general inferiority to the other members of the class. The members of the Ignored Group heard the praise and reproof given to the two other groups, but they themselves received no recognition whatsoever.

The results for the first and fifth days are presented in Table VI. The four groups are approximately equal in average and variability scores on the first test, but differences begin to appear in the second test and are shown throughout the series. The greatest improvement shown at the end of the series of tests occurred in the Praised Group, where the average increase was

<sup>7</sup> From Elizabeth B. Hurlock, "An Evaluation of Certain Incentives Used in School Work." *Journal of Educational Psychology*, 16, No. 3, 1925, pp. 145-159.

TABLE VI  
AVERAGE SCORES  
Results for First and Fifth Days

Groups	Averages		Standard Deviations		PE <sub>av</sub>	
	First Day	Fifth Day	First Day	Fifth Day	First Day	Fifth Day
Control	11.81	11.35	5.53	4.21	.73	.55
Praised	11.81	20.22	6.17	7.68	.79	.99
Reproved	11.85	14.19	6.55	6.78	.84	.87
Ignored	11.84	12.38	5.64	6.06	.74	.79

RELIABILITY OF DIFFERENCES—COMPARISON OF FINAL TESTS

Groups	Actual Difference	PE <sub>diff.</sub>	Difference in PE Units	Chances that True Difference Is Above 0
Praised—control	8.87	1.13	7.85	10,000 in 10,000
Reproved—control	2.84	1.02	2.78	9,382 in 10,000
Ignored—control	1.03	.95	1.08	5,338 in 10,000

8.41; the next largest in the Reproved Group, 2.34; and then only .54 in the Ignored Group, and a loss of .46 points on the average in the Control Group. When the statistical reliability of the differences was computed, it was found that only in the case of the Praised Group was the gain in the fifth test, over and above gain due merely to practice, as measured by the Control Group, large enough to be reliable. In the Reproved and Ignored Groups, gains did occur, but these were only indications of true differences, and were not large enough for absolute certainty. In like manner, a study of the percentage of average improvement within each group shows that the Praised Group is the only one which made a decided gain. The Reproved and Ignored Groups showed slightly greater gain in the third over the first than in the fifth over the first, while the Control Group showed a slight amount of decrease both times. The Praised Group is the only one which shows an increase in proficiency from the beginning of the series to the end.

## VI. Improvement and the Distribution of Practice <sup>8</sup>

*Robert Alexander Cummins*

It is the purpose of this monograph to report measurements of learning, especially by school children under ordinary classroom conditions, and with special reference to the distribution of time given to practice. The particular comparison made is between (1) a series of practice periods approximately equal in length, and (2) a series of practice periods decreasing progressively in length. . . .

<sup>8</sup> From Robert Alexander Cummins, *Improvement and the Distribution of Practice*. Teachers College, Columbia University: Contributions to Education, No. 97, 1919, pp. 1-35. Bureau of Publications.

The [experiment] to be reported here concern[s] the learning of geographical and historical facts by school children after the following manner: A brief condensed summary of the facts was studied. The knowledge thus gained was measured by giving the summary, with certain important words omitted, as a completion test. . . .

The subjects consisted of 114 pupils from the seventh grade, 130 from the sixth grade, 127 from the fifth grade, 178 from the fourth grade, and 150 from the third grade, making a total of 699 whose records were complete enough to count.

The material used for practice in geography was devised by the author. It consisted of condensed facts and principles printed on sheets six by ten inches in dimension. There were two sheets of a kind, one being used for study and the other for the test, the only difference being that on the test sheets certain important words were arbitrarily omitted. Our general plan was to conduct the experiment under ordinary school conditions, equalizing all the factors save that of distribution of practice. . . .

The score was the number of words remembered and correctly written. The per cent of words attempted that were found correct was taken as the index of accuracy. Inasmuch as most of the time was taken up with the study of the text, no attempt was made to keep a daily record of the scores. . . .

The total amount of time consumed in each of the geography and history experiments was 120 minutes. The *Equal* group included classes "p" and "r," which had schedules with practice periods of twenty minutes in length. The *Reducing* group included classes "q" and "s," which had schedules with practice periods decreasing in length and averaging just twelve minutes. The experiment with these sixth-grade classes extended over a period of fifteen days, from the 9th to the 24th of February. . . .

In both cases the results show a greater improvement for the groups which followed the *Reducing* schedule, roughly speaking, one-seventh more. The facts appear in Table VII. . . .

Summing up the experiments with geography and history, [we find that] the *Reducing* schedule shows notably better results. No sure conclusions con-

TABLE VII

COMPARISON OF RESULTS OF THE EQUAL AND THE REDUCING GROUPS AFTER EQUALIZING INITIAL ABILITY BY THE METHOD OF "PAIRING OFF" THE INITIAL SCORES OF THE TWO GROUPS

Group	Grade	Material	No. of Pupils	Initial Score	Gross Gain
Equal	7	Geog.	52 (56)	30.77 (29.89)	41.96 (40.84)
Reduc.	7	Geog.	53 (58)	30.76 (30.67)	47.11 (48.86)
Equal	6	Geog.	28 (34)	43.04 (45.50)	19.54 (21.15)
Reduc.	6	Geog.	25 (35)	42.88 (37.74)	29.24 (24.29)
Equal	6	Hist.	23 (30)	34.26 (31.10)	9.13* (8.47)
Reduc.	6	Hist.	22 (31)	34.18 (39.52)	38.77 (40.25)

\* Special disturbances characterized this group.



cerning the reasons for this superiority can be drawn, owing to the various factors entering in, many of which could not be very rigorously controlled. With such a large margin of variability in the results thus far considered, it would certainly be far from conservative to attribute the advantage in favor of the *Reducing* schedule to the difference in the length of the practice periods, or the intervals between practice periods, alone.

## VII. The Intelligence Quotient as a Factor in the Whole-Part Problem<sup>9</sup>

Grace O. McGeoch

The conflicting experimental data on the whole-part problem have suggested with a high degree of probability that the relative efficiency of the whole and part methods of learning is a function of a number of variable experimental conditions, such as method of measuring learning efficiency, material, subjects, type of part method used, and practice. As a consequence, some of the later investigators have arranged their experiments so as to test systematically the possible influence of some such factor.

The present study is an attack upon the problem: Is the relative efficiency of the whole, progressive part and pure part methods in learning and retention a function of the intelligence quotient of the subject?

The thirty-three children (seventeen girls and sixteen boys) who constituted the gifted group were of the mental level which Terman has classified as "near genius or genius," i.e., I.Q. 140 and above. The mean chronological age of the group was 9-9, and the mean I.Q. 151.2 with a 40-point range, between I.Q. 140 and I.Q. 180.

The thirty-five children (eighteen boys and seventeen girls) who constituted the normal group were of "normal or average" intelligence according to Terman's classification. This group had a mean chronological age of 10-0, and a mean I.Q. of 99.4 with a 10-point range, between I.Q. 95 and I.Q. 105.

Vocabularies (paired associates) and poems were the materials used. The following three learning methods were employed with the vocabulary material: the *whole method*, in which each pair was presented once in its regular order from one to ten, and this procedure was repeated ten times; a *pure part method*, in which each pair was presented ten times in succession before the next pair was shown; and a form of the *progressive part method*, in which the pairs were presented in groups of two, with one review presentation of all the pairs that had been shown before, after each new group of two was added.

With the poetry the following three learning methods were employed: the *whole method*, in which the subject was told to "read through the whole poem just as many times as" he could in the allotted six minutes; a *pure part method*, in which twenty seconds were given for the reading of each line,

<sup>9</sup> From Grace O. McGeoch, "The Intelligence Quotient as a Factor in the Whole-Part Problem," *Journal of Experimental Psychology*, 14, No. 4, 1931, pp. 333-358.

typed on a sheet of paper by itself, and finally two minutes in which to review the whole poem which appeared on the last page; and a form of the *progressive part method*, in which one minute was given for the reading of the first verse which appeared on page 1, one minute for the second verse on page 2, one minute for a review of the first and second verses on page 3, one minute for the third verse on page 4, and finally, two minutes to review the whole poem on page 5.

In all four experiments, the material learned was again recalled after twenty-four hours in the same room and under the same experimental conditions as those of immediate recall.

The scores of the vocabulary material are in terms of the number of correct English equivalents. The poetry scores are in terms of the number of correct lines, without taking account of spelling or punctuation. There are two types of poetry scores: V, or *verbatim* scores, in which every word was correct and the line correctly placed; \* and S, or sense scores, in which the sense of the line was given but not in the exact words.

The mean scores given in Tables VIII and IX show that the part method was inferior to both the whole and progressive part in both groups.

TABLE VIII  
COMPARISON OF METHODS WITH VOCABULARY MATERIALS

Group	(A) LEARNING						
	Whole			Prog. Part		Part	
	No.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Gifted	32	3.51	1.60	3.60	1.80	2.03	1.24
Normal	31	1.58	.74	1.17	.90	1.09	.92
	(B) RETENTION						
	No.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Gifted . . . . .	32	2.03	1.37	1.68	1.49	1.12	.95
Normal	31	.69	.65	.66	.66	.33	.51

TABLE IX  
DIFFERENCES BETWEEN METHODS FOR VOCABULARY MATERIALS

	LEARNING				RETENTION			
	Gifted		Normal		Gifted		Normal	
	Diff.	S.D. of Diff.	Diff.	S.D. of Diff.	Diff.	S.D. of Diff.	Diff.	S.D. of Diff.
Whole—Prog. P..	-.09	.30	.41	.14	.35	.29	.03	.12
Whole—Part . . .	1.48	.27	.49	.18	.91	.20	.36	.13
Prog. P.—Part ..	1.57	.26	.08	.22	.56	.24	.33	.13

\* On the rare occasions when a perfect line was out of place, it was counted under sense scores.

With the normal group, the chances are 99 out of 100 that the whole is superior to both the progressive part and pure part methods, but the intermediate position of the progressive part is not statistically validated. With the gifted group, the part method is reliably inferior to both the whole and progressive part methods between which there is no reliable difference.

Valid comparisons can be made between the three methods employed in the experiment involving the learning of poetry, since they were used in a counterbalanced practice order and had had equal previous practice. The mean *verbatim* scores, as well as the mean composite scores, *verbatim* plus sense scores, in Table X show only small differences, all in fractions of a line, between the three methods within each group. This lack of significant differences between the three methods is also apparent in the percentage of subjects finding each method superior.

TABLE X  
COMPARISON OF METHODS IN LEARNING POETRY

Group	No.	Scores	Whole		Prog. Part		Part	
			Mean	S. D.	Mean	S. D.	Mean	S. D.
Gifted	31	V	4.80	2.65	4.98	2.50	4.59	2.54
		V-S	8.38	2.65	8.81	2.59	8.18	2.64
Normal	31	V	.66	.45	.56	.60	.65	.62
		V-S	2.60	1.18	2.54	1.13	2.64	1.29

*Conclusions.*—(1) The I.Q. is a factor conditioning the relative efficiency of the whole, progressive part and pure part methods in learning. Its efficacy as a factor is apparent, at least, in a comparison of gifted and normal children.

(2) Type of learning material is also a factor, which, however, may be a function of the amount of practice and the kind of part methods used.

### VIII. Learning from Lectures vs. Learning from Readings<sup>10</sup>

*Stephen M. Corey*

The lecture method, as it is ordinarily understood, consists in an instructor telling his students about a particular field of knowledge. Pedagogically, it is distinguished from other teaching techniques such as the oral quiz, the discussion, or the project, in which the activity of the students—the learners—is more apparent. The typical, formal, lecture is well illustrated in the field of history, wherein the instructor frequently puts in two full hours a week telling a large class about the course of human events, with one period set aside for clarification or relief, and called a “quiz” section.

The present investigation was planned as follows. A twenty-five hundred word lecture on “outlining” was prepared and mimeographed in quantity.

<sup>10</sup> From Stephen M. Corey, “Learning from Lectures vs. Learning from Readings.” *Journal of Educational Psychology*, 25, No. 6, 1934, pp. 459-470.

The writer familiarized himself with this material and found that his delivery averaged very close to one hundred words per minute. In order to hold the time factor constant it was decided to allow those students who read the materials as many minutes for their study as were required for the lecture. Immediately after both the lecture and the reading period a test of immediate recall was administered. This same test was given again, without warning, two weeks later to measure retention over a longer interval. The test used was a semiobjective true-false, completion, and short-answer type with a reliability, computed odd against even items and corrected by the Spearman-Brown prophecy formula, of .773 for the reading materials and .779 for the same test over the same subject matter presented in the lecture. These reliabilities are sufficiently high to make group comparisons valid.

The subjects were not permitted to make notes, but they were told that an immediate recall test would be given over the materials involved. No notes were made, because this would have made it impossible to determine how much of any difference discovered was due to this factor, or to some more or less inherent difference between the learning resulting from listening to lectures or reading.

TABLE XI

COMPARISON OF MEAN SCORES OF LECTURE AND READING GROUP WITH RESPECT TO IMMEDIATE AND DELAYED (FOURTEEN DAYS) RECALL

	<i>Reading</i>		<i>Lecture</i>				<i>Chances in One Hundred that Difference Is Significant</i>
	Mean	S.D.	Mean	S.D.	Diff	S.D.	
Immediate recall	22.87	3.33	21.50	3.48	1.37	.43	100
Delayed recall	17.22	4.08	17.12	3.77	.10	.63	56

Table XI represents the mean scores and the difference between them for the reading and lecture groups on immediate and delayed recall. For immediate recall the reading group was superior to the lecture group. Taking exactly the same test over identical materials, reacted to for the same length of time, reading resulted in somewhat greater immediate retention than listening to a lecture. The difference between the scores of the two groups on a surprise quiz given fourteen days after the presentation of the subject matter again favored the reading group but was statistically insignificant.

Table XII represents similar findings for delayed recall, with this difference: the subjects are classified according to their psychological test quarters. None of these differences is significant, although there is a noticeable tendency for the superior students to do somewhat better on the reading and the inferior students somewhat better on the lecture. The groups represented in Table XII are not sufficiently large to permit of much generalization.

TABLE XII

MEAN SCORES PER PSYCHOLOGICAL TEST QUARTER FOR THE TWO GROUPS ON DELAYED RECALL

	Reading			Lecture			Difference
	No.	Mean	S.D.	No.	Mean	S.D.	
Highest	24	19.78	4.42	27	19.00	3.59	.78
Middle two	41	16.75	3.33	32	17.10	3.31	.35
Lowest	13	13.93	2.24	22	14.92	3.57	.99

*Conclusions.*—The following statements would appear to be justified in view of the technique employed in the present study:

(1) Immediate recall is better for materials students have read than for the same materials heard in lecture.

(2) The two types of presentation have no very significant effect upon delayed (fourteen days) recall.

(3) There is a tendency for students scoring in the highest psychological test quarter to do relatively better on reading than on lecture tests.

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## EXERCISES

1. Give illustrations from your own school experience of violations of the following principles taken from Thorndike's article "How We Learn" (II, 1).

- "The mere repetition of a situation does not cause adaptive learning."
- "Merely putting things in the mind in sequence is likely to be futile as a means of getting one to evoke the other later."

(c) "Punishments are very unreliable forces in learning."

(d) "Connections are easy to form in proportion as the situation is identifiable and distinguishable from others."

2. Describe and criticize Pressey's technique for determining the differences between good and poor students (II,2).

3. The following true-false statements are based upon Pressey's investigation of study methods:

(a) T F Good students do not attempt to study regularly in a particular place.

(b) T F Good students do not find it necessary to attend directly to the graphs or tables in textbooks.

(c) T F Good students are more likely than poor students to give a chapter a preview before studying it intensively.

(d) T F Good students usually take notes in class just as rapidly as they can write.

(e) T F In general it is the poor student who stays up late the night before an examination studying.

(f) T F The poor student tends to memorize the textbook.

4. Using the study by Warner and Guiler (III) as a point of departure, outline in detail an hypothetical study entitled, "Adaptation of learning to individual differences in the teaching of American history."

5. Explain in psychological terms the superiority of reading *and* reciting over mere reading as a technique for the acquisition of knowledge.

6. (a) Describe the different methods you have observed of:

Motivating school children by rewarding them,

Motivating school children by punishing them.

(b) In general which type of motivation is resorted to more frequently? Why?

7. (a) Describe the following three methods of memorizing:

The whole method,

The pure part method,

The progressive part method.

(b) State which of these methods is in general superior and tell specifically how this information might contribute to the learning of:

Latin,

Science,

History.

8. (a) Explain the popularity of the lecture method as a method of teaching.

(b) What advantages in learning might result from the elimination of most lectures and the substitution of readings? Why?

## CHAPTER IX

### EMOTIONAL DEVELOPMENT AND CONTROL <sup>1</sup>

*Max Schoen, Carnegie Institute of Technology*

#### I. The Nature and Function of Emotion

Growth proceeds along many fronts at the same time and almost continuously from the beginning of life until senility. There are physiological, social-moral, intellectual, volitional, and emotional aspects of growth. The readings in this chapter have been selected for the purpose of helping the student gain an understanding of how growth takes place through emotional development and control.

#### I. INTRODUCTION <sup>2</sup>

*Arthur T. Jersild*

Many studies of emotion have taken their cue from the fact that emotional excitement is accompanied by bodily phenomena, such as changes in visceral tone, muscular tension, pulse rate, and blood pressure. Much painstaking work has been done to measure and record these phenomena. To date no clear-cut patterns have been found to differentiate between experiences which in daily speech we call by such names as anger, fear, and joy. One result has been that terms used in dealing with emotion have been under fire as lacking in scientific precision. It has even been proposed that such worthies as "emotion," "anger," "fear," and other familiar terms, be cast out of psychology, just as psychology some years ago took pains to evict terms such as "soul," "will," and "mental faculties." Before this demand is heeded, however, the laboratory worker may rightfully be asked to push his studies somewhat farther, and to recognize that laboratory measurements of momentary bodily changes represent only a small part of the total picture of an emotional experience as it occurs in daily life.

Two major methods have been used in the study of emotion. One procedure is to observe the emotional expressions of others in the natural situations of everyday life. This method has been used effectively in the study of laughter and crying, anger, fear, and sympathy. Careful records are taken of the situation that confronts the child, his reaction to it, and the subsequent

<sup>1</sup> These excerpts will supplement the discussions found in such standard texts as Griffith, *An Introduction to Educational Psychology*, Chapter VI; Skinner and Collaborators, *Educational Psychology*, Chapter VIII; Trow, *Educational Psychology*, Chapter III; Fletcher, *Psychology in Education*, Chapter VIII; Gray, *Psychological Foundations of Education*, Chapter IV; Sandiford, *Educational Psychology*, Chapter VII, and Gast and Skinner (H.C.), *Fundamentals of Educational Psychology*, Chapter XIV.

<sup>2</sup> From A. T. Jersild, "The Development of the Emotions," in Skinner, C. E. (Ed.), *Educational Psychology*. New York: Prentice-Hall, Inc., 1936, pp. 192-194.

apparent effects on his behavior. While less precise than laboratory methods that offer a momentary picture of a part of the emotional experience, this method yields information that has practical value. It is possible also to precipitate matters by loading the environment with provocations while the child still remains free to move about and to do as he pleases. This method is more effective with younger than with older children, for the younger child is more likely to express himself freely.

The other major method is that of self-observation: the individual himself is asked to reveal his emotions, to tell about his fears, his likes, dislikes, joys, and sorrows. This procedure has the shortcomings of the introspective method, chief among which is the difficulty of verifying what the subject has revealed. But any realistic study of emotion in older children and adults must necessarily make use of this method, unless the research worker is interested in only a part of the story.

In general, we shall use the term "emotion" as denoting an experience in which most important elements, as far as the person himself is concerned, are qualitative feelings plus an impulse to action of one sort or another; to this must be added the fact that the total experience also involves more or less profound bodily reactions. This statement of the meaning of emotion obviously is rough and oversimplified, for emotions do not occur as pure entities, with now a distinct package of fear, and now of anger. Actually, emotional experiences, both in their bodily aspects and in their subjective aspects of impulse and feeling, occur in countless "mixtures," with limitless varieties and gradations. But for practical purposes it is necessary to apply arbitrary labels to experiences that are roughly distinguishable in daily life.

## 2. THE EXPRESSION OF EMOTION<sup>3</sup>

*Charles Darwin*

Rage exhibits itself in the most diversified manner. The heart and circulation are always affected; the face reddens or becomes purple, with the veins on the forehead and neck distended. The reddening of the skin has been observed with the copper-colored Indians of South America, and even, as it is said, on the white cicatrices left by old wounds on negroes. Monkeys also redden from passion. With one of my own infants, under four months old, I repeatedly observed that the first symptom of an approaching passion was the rushing of the blood into his bare scalp. On the other hand, the action of the heart is sometimes so much impeded by great rage, that the countenance becomes pallid or livid, and not a few men with heart disease have dropped down dead under this powerful emotion.

The respiration is likewise affected; the chest heaves, and the dilated nostrils quiver. As Tennyson writes, "sharp breaths of anger puffed her fairy

<sup>3</sup> From Charles Darwin, *The Expression of the Emotions in Man and Animals*. New York: D. Appleton-Century Company, 1896, pp. 240-241; 289-291.



nostrils out." Hence we have such expressions as "breathing out vengeance," and "fuming with anger."

The excited brain gives strength to the muscles, and at the same time energy to the will. The body is commonly held erect ready for instant action, but sometimes it is bent forward towards the offending person, with the limbs more or less rigid. The mouth is generally closed with firmness, showing fixed determination, and the teeth are clenched or ground together. Such gestures as the raising of the arms, with the fists clenched, as if to strike the offender, are common. Few men in a great passion, and telling some one to begone, can resist acting as if they intended to strike or push the man violently away. The desire, indeed, to strike often becomes so intolerably strong that inanimate objects are struck or dashed to the ground; but the gestures frequently become altogether purposeless or frantic. Young children when in a violent rage roll on the ground on their backs or bellies, screaming, kicking, scratching, or biting everything within reach. . . .

*Fear, terror.*—The word "fear" seems to be derived from what is sudden and dangerous; and that of terror from the trembling of the vocal organs and body. I use the word "terror" for extreme fear; but some writers think it ought to be confined to cases in which the imagination is more particularly concerned. Fear is often preceded by astonishment, and is so far akin to it that both lead to the senses of sight and hearing being instantly aroused. In both cases the eyes and mouth are widely opened and the eyebrows raised. The frightened man at first stands like a statue motionless and breathless, or crouches down as if instinctively to escape observation.

The heart beats quickly and violently, so that it palpitates or knocks against the ribs; but it is very doubtful whether it then works more efficiently than usual, so as to send a great supply of blood to all parts of the body; for the skin instantly becomes pale, as during incipient faintness. This paleness of the surface, however, is probably in large part, or exclusively, due to the vasomotor center being affected in such a manner as to cause the contraction of the small arteries of the skin. That the skin is much affected under the sense of great fear we see in the marvelous and inexplicable manner in which perspiration immediately exudes from it. This exudation is all the more remarkable, as the surface is then cold, and hence the term a cold sweat; whereas, the sudorific glands are properly excited into action when the surface is heated. The hairs also on the skin stand erect; and the superficial muscles shiver. In connection with the disturbed action of the heart, the breathing is hurried. The salivary glands act imperfectly; the mouth becomes dry, and is often opened and shut. I have also noticed that under slight fear there is a strong tendency to yawn. One of the best-marked symptoms is the trembling of all the muscles of the body; and this is often first seen in the lips. From this cause, and from the dryness of the mouth, the voice becomes husky or indistinct, or may altogether fail.

3. PHYSIOLOGICAL PROCESSES IN EMOTION<sup>4</sup>*Carney Landis*

Stimuli which bring about emotional reactions are particularly effective in their action on the autonomic nervous system and glands of internal secretion. In fact most of our remarks concerning the action of the autonomic nervous system are directly descriptive of much emotional reaction. The balance or lack of balance of visceral activity, the diffuseness of this activity, the involuntary nature of the responses, the lack of direct cortical representation, etc., all mark much of our expression of emotion.

We are not yet in a position to say that emotional reactions are uniformly identifiable with the action of the neurohumoral mechanism, since we are still profoundly ignorant of many phases of the true nature of both emotional reaction and of the neurohumoral control. But as far as our knowledge goes at present there does seem to be good reason to believe that much of "emotion" as it is conceived of in the biological sciences, is mediated particularly by the action of the autonomic nervous system and glands of internal secretion.

There are in the body a number of secretory organs or tissues which throw their product directly into the blood stream. Such organs are called *endocrine* glands or glands of internal secretion. The *adrenal* glands are directly involved in the physiological expression of emotion. Two forms of secretion are known to be produced by these glands: that of the *medulla* of the gland which is called *adrenin*, and that of the *cortex* of the gland which is called *cortin*. Cortin has, among other things, the function of maintaining the oxygen-carrying power of the blood. It is absolutely necessary for the life of the organism. Emotional stimulation leads to the secretion of adrenin. An excess of adrenin in the blood stream brings about what Cannon has termed emergency reactions of biological survival value.

Cannon and his co-workers have demonstrated that adrenin is secreted directly into the blood stream during emotional stimulation. An increase in the amount of adrenin in the blood has the following effects upon physiological activity: (1) it increases the tremor in voluntary muscle; (2) it causes relaxation of smooth muscle; (3) it counteracts fatigue in voluntary muscle by affecting the myoneural junction; (4) it alters blood distribution; (5) it alters blood pressure; (6) it hastens the rate of clotting of the blood; (7) it relaxes the bronchioles; (8) it causes the liver to release glycogen into the blood stream; and (9) it causes the spleen to secrete or release red blood corpuscles into the blood stream. All these physiological changes which are brought about by adrenin may be considered emergency reactions which enable an organism to meet a situation which will call for the quick and probably prolonged discharge of energy. These reactions do not offer a pattern of response which enables one to differentiate emotions, but they do furnish a background for emotion in general.

<sup>4</sup> Reprinted by permission from *Psychology* by Boring, Langfeld, and Weld, published by John Wiley & Sons, Inc.

Several investigators have studied the effect of the direct injection of adrenin into normal and abnormal adults. They found that many individuals reported merely the physiological disturbance, as perceived without any experiential emotional accompaniment. Other persons experienced what has been called a "cold emotion." That is to say, they had an experience which they felt was somehow emotional in nature, although no situation which would justify the experience was present. One subject termed the experience "a feeling like an accident waiting for some place to happen." A few individuals reported, subsequent to the injection of the adrenin, true, satisfactory emotional experiences. Sometimes this experience was characterized as anxiety, apprehension, fear or anger, but the subject could detect no difference between his experience and any other emotional experience which he had had. There was difference between the reactions of normal and psychopathic persons in this respect.

The *thyroid* gland lies in front of the upper part of the trachea. Its internal secretion is known as *thyroxin*. There is no experimental work to show that thyroxin is secreted directly in response to emotional situations. However, it is probable that such secretion does take place. We know that in goiter (a diseased condition of the thyroid gland) a marked emotional instability of the patient occurs. Such patients overact to practically any situation involving emergency or pain, and are in a state of heightened tension and irritability practically all the time. In other diseased conditions in which the thyroid gland is not functioning, we find a marked decrease or absence of emotional expression or responsiveness. The patient is stolid, stuporous, or sluggish. It would seem that the thyroid secretion sets up a physiological background for emotional response. Whether or not this background functions in other than abnormal or diseased conditions, it is impossible to say at present.

The internal secretions of the sex glands are known to be directly connected with sexual desire and sexual experience. However, actual experimental work on this subject has never been carried out with human beings. It seems probable that the secretions of the endocrine glands, such as the pituitary, are involved in the emergency reactions in some fashion. Direct evidence is not at present available on this point.

#### 4. THE FUNCTION OF EMOTION<sup>5</sup>

*Frederick Arthur Hodge*

Pagano, as early as 1906, adduced evidence which has later been corroborated by the careful experiments of Head, Cannon, Britton, Bard and others, to demonstrate that the nerve impulses controlling the visceral organs originate in the thalamus at the base of the brain. The cortex is apparently unable either to inhibit or control visceral reactions and such reactions have been observed to proceed in animals even after the cortex of the brain has been

<sup>5</sup> From Frederick Arthur Hodge, "The Emotions in a New Role." *Psychological Review*, 42, 1935, pp. 557-558; 559-560.

extirpated. The thalamus is the older part of the brain in phylogenetic development and is, therefore, more subject to pattern activities that have been developed through the ages of racial experience than is the cortex, which is more specific and individual in its reactions.

The thalamus receives afferent fibers from all parts of the body and forms reflex arcs to the viscera. But these afferent tracts also have synaptic connections in the thalamus with the cortex. Motor tracts pass from the cortex directly to the skeletal muscles, but some of them are also associated with efferent visceral tracts in the thalamus. It is, therefore, possible for the brain to respond to any situation which confronts us by means of efferent visceral stimulation from the thalamus, or with more specific skeletal movements and postures originating in the cortex, or with a combination of visceral and skeletal reactions determined in both thalamus and cortex.

During the long ages before the cortical centers of the brain reached their present ability to function there was constant need for prompt reaction to meet the emergencies of life.

Such reactions as were successful in warding off impending dangers were selected through their greater survival values and the patterns of these activities became deeply imprinted in the neural pathways of the race. These pattern activities in the viscera have a definite function in providing man with the physiological means for sudden and excessive action. Whenever he was confronted by a situation demanding either fight or flight, emotions of anger or fear were aroused and their corollary visceral activities were immediately organized and put on a war basis. The adrenal glands released adrenin into the blood stream and the adrenin caused the liver to give up its store of blood sugar. Sugar banished fatigue and provided renewed energy for physical activities. The heart beat was accelerated and arteries contracted, raising the blood pressure. Blood was drained from the viscera into the extremities of the body which were thereby prepared for the extra exertion that might be demanded of them. . . .

Whenever a situation involving a menace to life, liberty or well-being confronts us, it is liable to arouse an emotional state. But a similar situation, that is robbed of menace either by some perceived condition or through our own confidence to deal with it, involves only a simple cortical response without emotional content. Emotion is aroused whenever the higher centers of the brain fail to provide a fitting response to the perceived situation, or when a doubt is aroused as to our ability to successfully respond to it. If the man who meets a bear at large has a gun in his hands and knows how to use it, his morale will not be shaken and his confidence in the outcome will inhibit both fear and visceral reaction.

*Emotional reactions are inversely proportional to the ability of the higher centers of the brain to meet a given situation.* A well-turned response will inhibit the blush of modesty suffusing the cheeks of a maid. We weep in sorrow because we can think of no specific activity adapted to the situation that has caused our sorrow. If we strike a man who has insulted us, our anger

vanishes with the blow, and we pick him up and dust off his clothes. Walk away without avenging the insult and the more we think of it the angrier we become.

### 5. THE WIDER FUNCTION OF EMOTION <sup>6</sup>

*George M. Stratton*

The emotional seizure is thus an intricate and sudden reorganization of all powers, both motor, impulsive, and cognitive, in order to meet a situation fateful for our interests. But such an account of emotion's office holds true only within certain limits of emotional intensity. Excitement may become excessive, and then the commotion or disarrangement of our usual mental combinations is not succeeded by a rearrangement which is more suitable and which helps us to meet the crisis with prospect of success. There here follows in the train of that disorganization toward which all emotion tends no beneficent reorganization. Thus we find that in intense fear there may be a paralysis, not simply of the muscular system, but of the impulses to movement, and probably also a freezing of the stream of ideas. The object of our horror here so fascinates us as to preclude all play of attention whereby the immediate object is properly related to its surroundings and to the imagined possibilities of action which fear ordinarily will arouse. It is probable that something resembling this occurs in moments also of intense anger. The outraged person may be incapable not only of motor action, but also of any free rise and play of images and ideas and judgments around the object of his anger. Nothing clearly suggests itself for him either to think or to do. His mind, at the height of its passion, is for the moment fixed, as though in stone. So also the excitement which some orators experience as a beneficent stimulation may not at all have this character for the timid or unseasoned speaker. With him the excitement is merely disorganizing, and the operations which in calm moments would move into free rearrangements are now kept in disorder or are blocked. This exceptional effect of excessive emotion is also to be illustrated by the absurdities which occur in high excitement. When Morgan's men were making their famous raid into the North during our Civil War, their conduct at certain moments was that of men beside themselves. They would rush into some country store and, in a whirl of glee, seize anything at hand. They would stuff their pockets with horn buttons, start off to southern climes with a string of skates, or with a chafing dish on pommel, encumbrances only to be thrown to roadside after some miles of gallop. They behaved it is said, like boys raiding an orchard.

Other ridiculous things done in stress of panic would be here in point. During a recent conflagration in Berkeley a young man who risked his life to save the property of others emerged from a flaming building with his pockets stuffed with bedroom slippers. And I myself noticed, in viewing the next morning the salvage that had been carried hurriedly to one of the fire-

<sup>6</sup> From "An Experience During Danger and the Wider Function of Emotion," in *Problems of Personality* by George M. Stratton, copyright, 1925, by Harcourt, Brace & Co., pp. 60-62.

proof buildings of the University, that hard by a costly mahogany clock someone had rescued a pan of baked apples. The dissociative effect of emotion has in such cases remained as a too-enduring effect. The explosive violence of the excitement has prevented the free functioning of the higher processes.

Now this exceptional effect is easy to observe, and, looked at too narrowly, had led to an entirely mistaken conception of emotion's function. Emotion has appeared as merely a breakdown of organization. It is as though one were to find the characteristics, let us say, of perception, not in its successes but in its failure, as when it arrives only at illusion or hallucination. The excesses of emotion then need not conceal from us the fact that normally there is, instead of a *breakdown*, rather a temporary *breakup*, in preparation for a more effective reorganization, with added resources now freely at our disposal. . . . Emotions in their sthenic phase, it would seem to me, are not mere energizers but are also diversifiers, leading to a fresh or less usual organization. Emotions are awakeners of dormant functions; and when awakened, these sleeping powers are given a special direction and objective. But emotions are also repressive; and, while some functions are awakened, others are rendered dormant or are forced into a dissociated action.

In all this it is clear, I believe, that the function of emotion is not confined to the motor region; it extends far beyond this, into the cognitive field. And in this cognitive field the emotions serve likewise both as energizers and as reorganizers. As energizers; for where a function properly connected with the emotional impulses is already active or becomes active, it becomes more vigorously active because of the emotion. But also as reorganizers; for, in the cognitive awakening which emotion brings, there is an increased intellectual fertility, with varied and novel ideas put at the disposal of the vague impulses. There is, however, no mere miscellany of ideas rising up, and in confusion. There is rather, a rise especially of such as promise some use in the present crisis. And among them there is a rapid selection and rejection, an organization of some of them about the focus of present action, while others are dissociated and either vanish or become grouped about some other center.

A wide service is thus rendered by emotion. For when so stirred, the individual finds himself at a new level of behavior both in body and in mind, being enabled to meet his crisis with a more complete array and organization of his powers, and these not of his muscles only, but of his entire psychophysical constitution.

## II. The Development of Emotion

### I. ARE THERE ANY NATIVE EMOTIONS ?

*John B. Watson*

I feel reasonably sure that there are three different forms of response that can be called out at birth by three sets of stimuli. Don't misunderstand me

<sup>7</sup> From John B. Watson, "Experimental Studies on the Growth of the Emotions." *The Pedagogical Seminary and Journal of Genetic Psychology*, 32, 1925, pp. 337-340.

if I call these responses "fear," "rage," and "love." Let me hasten to assure you that while I use the words fear, rage, and love, I want you to strip them of all their old connotations. Please look upon the reactions we designate by them just as you look upon breathing, heart beat, grasping, and other unlearned responses studied in the last chapter.

The facts follow.

*Fear.*—Our work upon infants, especially those without cerebral hemispheres, where the reaction is more pronounced, early taught us that loud sounds almost invariably produced a marked reaction in infants from the very moment of birth. For example, the striking of a steel bar with a hammer will call out a jump, a start, a respiratory pause, followed by more rapid breathing with marked vasomotor changes, sudden closure of the eye, clutching of hands, puckering of lips. Then occur, depending upon the age of the infant, crying, falling down, crawling, walking or running away. I have never made a very systematic study of the range of sound stimuli that will call out fear responses. Not every type of sound will do it. Some extremely low-pitched, rumbling noises will not call them out, nor will the very high tones of the Galton whistle. In the half-sleeping infant of two or three days of age I have called them out repeatedly by suddenly crinkling a half of a newspaper near its ear, and by making a loud, shrill, hissing sound with the lips. Pure tones, such as those obtained from the tuning fork at any rate, are not very effective in calling them out. Considerably more work must be done upon the nature of the auditory stimulus as well as upon the separate part reactions in the response before the whole stimulus-response picture is complete.

The other stimulus calling out the same fear reaction is loss of support—*especially when the body is not set to compensate for it*. It can best be observed in newborns just when they are falling asleep. If I dropped them, or if the blanket upon which they lie is suddenly jerked, pulling the infant along with it, the response invariably occurs.

In infants only a few hours old this fear reaction is quickly "fatigued." In other words, if the same sound or the same kind of loss of support stimulus is frequently applied, you can often call out the reaction only once. After a few moments' rest those same stimuli are again effective.

Even in the case of the adult human and higher mammals, loss of support when the individual is not set for it calls out a strong fear reaction. If we have to walk across a slender plank, naturally as we approach it the muscles of the body are all set for it, but if we cross a bridge which remains perfectly steady until the middle has been reached and then suddenly begins to give way, our response is very marked. When this happens in the case of a horse, one can with difficulty get him to cross bridges again. There are many horses in the country bridge-shy. I am sure the same principle is operative when a child is rapidly let out into deep water for the first time. The buoyancy of the water actually throws him off his balance. Even when the water is warm there is a catching of the breath, clutching with the hands, and crying.

*Rage.*—Have you ever had the never-to-be-forgotten experience when proudly walking across a crowded street holding your two-year-old daughter's hand, of having her suddenly pull you in some other direction? And when you quickly and sharply jerked her back and exerted steady pressure on her arm to keep her straight did she then suddenly stiffen, begin to scream at the top of her voice and lie down stiff as a ramrod in the middle of the street, yelling with wide-open mouth until she became blue in the face, and continuing to yell until she could make no further sound? If you have not, any picture of rage behavior must appear lifeless to you.

Possibly you have seen the large village bully take some child, down him, and hold his arms and legs so closely to his body that the child could not even struggle. Have you watched the youngster stiffen and yell until he became blue in the face?

Did you ever notice the sudden changes that come into the faces of men when they are jostled and suddenly and unduly crowded in the street cars and railway trains? *Hampering of bodily movements* brings out the series of responses we call rage. This can be observed from the moment of birth but more easily in infants ten to fifteen days of age. When the head is held lightly between the hands, when the arms are pressed to the sides, and when the legs are held tightly together, rage behavior begins. The unlearned behavior elements in rage behavior have never been completely catalogued. Some of the elements, however, are easily observed, such as the stiffening of the whole body, the free slashing movements of hands, arms, and legs, and the holding of the breath. There is no crying at first, then the mouth is opened to the fullest extent and the breath is held until the face appears blue. These states can be brought on without the pressure in any case being severe enough to produce the slightest injury to the child. The experiments are discontinued the moment the slightest blueness appears in the skin. All children can be thrown into such a state and the reactions will continue until the irritating situation is relieved, and sometimes for a considerable period thereafter. We have had this state brought out when the arms are held upward by a cord to which is attached a lead ball not exceeding an ounce in weight. The constant hampering of the arms produced by even this slight weight is sufficient to bring out the response. When the child is lying on its back it can occasionally be brought out by pressing on each side of the head with cotton wool. In many cases this state can be observed quite easily when the mother or nurse has to dress the child somewhat roughly or hurriedly.

*Love.*—The study of this emotion in the infant is beset with a great many difficulties on the conventional side. Our observations consequently have been incidental rather than directly experimental. The stimulus to *love responses* apparently is stroking of the skin, tickling, gentle rocking, patting. The responses are especially easy to bring out by the stimulation of what, for lack of a better term, we may call the erogenous zones, such as the nipples, the lips, and the sex organs. The response in an infant depends upon its state; when crying the crying will cease and a smile begin. Gurgling and cooing



appear. Violent movements of arms and trunk with pronounced laughter occur in even six to eight months old infants when tickled. It is thus seen that we use the term "love" in a much broader sense than it is popularly used. The responses we intend to mark off here are those popularly called "affectionate," "good natured," "kindly," etc. The term "love" embraces all of these as well as the responses we see in adults between the sexes. They all have a common origin.

## 2. DEVELOPMENT OF EMOTIONAL RESPONSES IN INFANTS <sup>8</sup>

*Mandel Sherman*

The previous experiments indicated that observers were unable to differentiate between the emotional responses of newborn infants resulting from four stimuli, restraint of the head and face, dropping suddenly, sticking with a needle, and hunger. The responses of the infants were presented to groups of observers consisting of graduate students in psychology, medical students, and college freshmen, by means of motion pictures, and to medical students, student nurses, and graduate students in psychology by actual observation in the nursery. When graduate students were allowed to observe only the responses, that is, when the stimuli causing the reactions were not shown, they named from twelve to twenty-five different emotions, and their judgments showed a wide dispersion. The group of medical students named eight different emotions in response to a similar presentation of the reactions of the infants. This difference in the number of emotions named was probably due to the difference in the character of the vocabulary of the two groups. A significant feature of the judgments of these two groups of observers was the different names given to the emotions. The graduate students named anger, fear, and pain most frequently, whereas the medical students named colic, hunger, organic brain emotion most frequently. This difference was again probably due to a difference in the interests and vocabulary of the two groups. In general the graduate students in psychology had no better success in naming and differentiating the emotional responses than did the college freshmen or the medical students.

The experimenter's observations coincided, insofar as success in differentiating the various emotions was concerned, with those of the various observers. The experiment upon the emotional responses of infants was begun during a study of a number of sensorimotor responses of newborn infants when the experimenter noted, for example, that the character of the response following restraint of the face did not differ from the reaction following sticking . . . a needle on the face. It was also found that the character of the responses was noticeably different to these two types of stimulation only when the stimulating conditions were varied quantitatively. It was felt, however, that because of the experimenter's possible predetermined attitudes

<sup>8</sup> From Mandel Sherman, "A Proposed Theory of the Development of Emotional Responses in Infants." *Journal of Comparative Psychology*, 8, 1928, pp. 385-388.

regarding the nature of the responses which would be expected to result from certain stimuli, no valid conclusions could be reached unless the responses of the infants were presented to a large group of observers.

The emotional responses of the infants, together with the stimuli calling forth those reactions, were also presented to groups of observers. The degree of success in naming and differentiating between the various emotional responses was much greater in this method of presentation than when only the responses were shown. A good example of the effect of the knowledge of the stimulus upon the success in naming the emotion was the difference in the judgments of the college freshmen when presented with only the responses and when shown both the stimuli and the ensuing reactions. When only the responses were shown to these observers, seventeen judgments of pain were made to the response called out by sticking with a needle out of a total of fifty-eight answers, but when both the stimuli and the responses were presented, thirty-six of the total of forty-six judgments of the same reaction were of pain. A similar increase in the "success" of these observers was noted in their judgments of the other responses of the infants when the stimuli causing the reactions were known. The increase in the degree of success of the other groups of observers when they had a knowledge of the causative stimuli was also significant, although the college freshmen showed a greater increase in success than any of the other observers.

The reasons given by the observers for their differentiation between the various emotional responses also showed that they were almost entirely influenced by the knowledge of the causative stimulus. Many observers stated that they named certain emotions because they knew that a particular emotional response should follow a particular stimulus. A large number admitted that they based their judgments mostly upon their knowledge of the stimulating conditions and very little upon actual differences in the behavior of the infants.

Some of the observers who were presented with the motion-picture views of the responses of the infants stated that they would be more successful in recognizing the emotional character of the reactions if they could hear the crying which is an integral part of the responses. An experiment was therefore conducted in which only the cries resulting from the four types of stimuli were presented to several groups of observers. When the judgments were tabulated it was found that the observers had as little success in naming and differentiating the emotional character of the cries as of the responses presented by means of motion pictures and by actual observation in the nursery.

The possibility of the existence of some differences in the responses of the infants to the stimuli employed is not denied, notwithstanding the fact that the observers could not generally differentiate the various responses. If the infants did show actual differences in their responses, they were of such little magnitude that they were negligible for the average observer. The conclusion may therefore be reached that the emotional responses of the newborn infant to the types of stimuli employed in the previously mentioned experi-

ments are undifferentiated, and the success of the individual observer in recognizing and differentiating the emotional character of these responses is due to a knowledge of the causative stimulating conditions.

### 3. GENETIC THEORY OF EMOTIONS <sup>9</sup>

*K. M. Banham Bridges*

It seems probable that the visceral responses, like other responses, are somewhat undifferentiated and unco-ordinated at birth. A strong stimulus or a sudden call to action creates general disturbance or excitement. It is difficult to tell whether a baby is frightened, angry, or even pleasantly excited. All parts of the autonomic nervous system are probably activated, and there may be alternation between sympathetic and parasympathetic hyperactivity. This general excitement, within a very short time—perhaps days and perhaps only hours—becomes somewhat differentiated into two general types of emotion as a result of experience. Certain situations, such as sudden disturbance of posture and hampering of movement, produce increased tension and mutual inhibition of many innervated muscles. This is both the result and further cause of autonomic activity, particularly sympathetic. There results an emotion somewhat different from general excitement, which may be called *distress*. It is the concomitant of unsatisfying experience and is probably what Watson has described as fear and rage.

The emotion aroused by progressively satisfying stimuli, such as to-and-fro movements, stroking and tickling, the contact of the nipple, or the appearance of food during moments of hunger, is more akin to the joyous excitement of older children and may be termed *delight*. The infant ceases to cry and smiles, coos, and waves his arms. This gesticulating, gurgling behavior of the delighted infant when presented with his bottle may change to distress if the bottle is withheld. The baby's muscles become tense, his face red and puckered, and he cries vigorously. The hunger sensations have probably been intensified by the sight of the bottle, and the feeding responses are checked and unsatisfied. Distress and delight in the infant are very readily interchangeable.

The behavior described above as infantile delight is the same as that designated by Watson as "love." This seems to the writer to be an unnecessarily broad use of the term "love." It is suggested, however, that primitive delight later becomes differentiated and associated with various instincts and behavior patterns to form several well-known adult emotions, one of which is love.

The genetic theory of the emotions is thus that excitement, the undifferentiated emotion present at birth, becomes differentiated and associated with certain situations and certain motor responses to form the separate emotions of later life. This process of differentiation and integration takes place gradually, so that at different age levels different emotions are distinguishable. The

<sup>9</sup> From K. M. Banham Bridges, "A Genetic Theory of the Emotions," *Journal of Genetic Psychology*, 37, 1936, pp. 516-519.

first two emotions to be thus evolved in early infancy are those referred to above, namely, distress and delight. These are distinguished by slight differences in visceral reactions, by the accompanying overt behavior, and by differences in the provoking situation.

*Distress in infancy* is characterized by muscle tension, interference in breathing, change in facial color, trembling, and crying. It is aroused by sudden or intense sensory stimuli, either internal or external, and by interference with normal activity such as the free movement of arms and legs in response to touch. *Delight in an infant* is characterized by relaxation of tension or normal muscle tonus, gurgling of saliva in the mouth, and by free random movements and soft vocalization. It is aroused by mild sensory stimuli, especially kinesthetic and cutaneous, which are changed sufficiently slowly or rhythmically to allow of muscular adjustment and compensatory responses. Delight is aroused by stimuli which facilitate natural response, whereas distress is aroused by stimuli which inhibit motor response or which come suddenly when the organism is not set to compensate for the shock.

As the infant develops other emotions may be recognized. These are certain behavior patterns of the total organism and are characterized more by the specific motor responses involved than by the visceral responses. The particular emotion is also determined by the nature of the situation which prompts it, including both internal bodily and external conditions. Thus distress becomes differentiated into fear at sudden shock and anger at interference. Delight also becomes further differentiated into joy and affection.

In *fear* certain responses of distress are exaggerated and are combined with instinctive avoidance reactions. Another similar group of responses forming part of the original distress are augmented and combined with pugnacious reactions to form the emotion of *anger*. Still another emotion derived from distress, especially at loss of accustomed attention and affections, is *jealousy*. Among the more specific pleasant emotions is *joy*. This is the manifestation of certain forms of delight in connection with organized interests. It may also include a possible pleasure-seeking instinct. *Affection* is response to caresses and other evidence of affection from another person and also to objects associated with such demonstrated affection. In the case of *filial affection*, it includes certain parts of the response of delight together with gregarious tendencies and submission. *Maternal affection* is a combination of certain delight responses with gregariousness, submission, and self-assertion. Mutual affection between children is both filial and maternal.

It is not quite clear just when the different emotions can first be distinguished. More observational studies of the emotional behavior of infants and young children of various ages need to be made before the emotions characteristic of each age period can be ascertained. By the *preschool age* there appear to be *seven or eight* different emotions. These are described briefly in the following paragraphs. They include not only the emotions with distinct characteristics noticeable at the preschool and subsequent ages but also the more undifferentiated emotions of early infancy.

It is difficult to determine from general observation of behavior in uncontrolled situations just what constitutes the separate emotions. Situations in everyday life are so complex that they frequently arouse many kinds of response at once. Thus more than one emotion may be aroused by different aspects of the same situation. A frightening situation, for instance, may also be an annoying one. Observation of emotional behavior on many different occasions helps in the isolation of the separable behavior combinations which may be called emotions, because in the different complex situations different pairs or groups of emotions may be aroused.

#### 4. EMOTIONAL DEVELOPMENT IN INFANTS<sup>10</sup>

*K. M. Banham Bridges*

The emotional behavior of young infants as observed in the Montreal Foundling and Baby Hospital seemed to lend support to the writer's theory of the genesis of the emotions. Emotional development was found to take place in three ways. The different emotions gradually evolved from the vague and undifferentiated emotion of excitement. The form of behavior response in each specific emotion changed slowly with developing skills and habits. Different particular situations would arouse emotional response at succeeding age levels, although these situations would always be of the same general type for the same emotions.

The one-month-old baby showed excitement in accelerated movement and breathing, upon any excessive stimulation. He exhibited distress by crying, reddening of the face and tense jerky movements at painful and other disagreeable stimulations. But he was more or less passive and quiescent when agreeably stimulated.

By three months of age the child was seen to exhibit delight in smiles, deep inspirations and somewhat rhythmic movements his bodily needs were being satisfied. Between three and four months angry screaming and vigorous leg-thrusts, in response to delay in anticipated feeding, were observed. A few weeks later anger was aroused when an adult's playful attention was withdrawn.

Distress and delight came to be expressed more in specific vocalizations with increasing age. General body movements gave place to precise responses to details of a situation. A four-month-old baby would laugh aloud with delight and cry tearfully when distressed. A child of five months was seen to cough and reject foods of a certain taste and consistency in incipient disgust. He would reach toward objects that caused him delight. By six months of age he showed definite fear when a stranger approached. He remained motionless and rigid, his eyes wide and staring. It is possible that "noninstitutional" children might show fear in response to other unusual or unexpected events a

<sup>10</sup> From K. M. Banham Bridges, "Emotional Development in Early Infancy." *Child Development*, 3, 1932, pp. 339-340.

little earlier than this. There was little variation in the daily routine of the children under observation, and fear was a rare occurrence.

By seven months of age the child showed positive elation, and renewed his activity as a result of success in his own endeavors. At eight months he began to show reciprocal affection for adults, and by twelve months, spontaneous affection. Delight was manifested in much laughter, bouncing up and down, and banging with the hand.

Between nine and twelve months of age the hospital babies would hide their heads, like ostriches, upon the approach of a relatively unfamiliar person. They would scream and become flushed with anger when their efforts or desires were thwarted; and they would cry out in fear and sit motionless after perceiving themselves falling.

It was observed that a child learns to kiss soon after twelve months of age, and by fifteen months he expresses his affection for other children. Anger over disappointment becomes more dramatic in its manifestation. The true temper tantrum makes its appearance roughly [at] about fourteen months of age. By eighteen months anger at adults is expressed in obstinate behavior; and annoyance at interfering children is manifested in hitting, pulling, and squealing.

Eighteen-month-olds would constantly seek the attention of adults, and take great delight in running about and making noises. One or two children of this age showed depressed, and other [children] angry, jealousy when another child received the coveted attention. A few specific fears were noticed; and several children developed particular affectionate attachments.

Thus it seems that in the course of development, emotional behavior becomes more and more specific, both as regards arousing stimuli and form of response. Distress, though more readily aroused, comes to find adequate expression in a variety of actions, and delight becomes sensitive appreciation and joy in numerous pursuits. The emotions, evolve slowly, and the exact age of differentiation is difficult to determine.

#### 5. GROWTH OF EMOTIONAL RESPONSES IN INFANTS<sup>11</sup>

*Mandel Sherman*

The genesis of the specific emotional reactions of children and adults lies in the responses available to the newborn infant. The reactions are at first generalized, but even in the earliest responses two types of reactions are noted: (1) that of rejecting the stimulus, and (2) that of accepting the stimulating condition. Examples of the first type of adjustive reaction may be seen in the response to such stimuli as restraint, dropping, and sticking with a needle. The reaction to these stimuli is that of a defense moment in order to remove the stimulating condition. The reaction of the infant to such stimulating conditions as stroking, feeding, and so on, illustrates the second

<sup>11</sup> From Mandel Sherman, "A Proposed Theory of the Development of Emotional Responses in Infants." *Journal of Comparative Psychology*, 8, 1928, pp. 392-394.

type of activity, that is, the adjustment by which the infant adapts himself to the continuance of the stimulus.

The emotional activity which serves to reject the stimulating condition may be further classified into the two following types: (1) the rejection of the stimulus by retreat, and (2) rejection of the stimulus by aggressive activity. The infant at birth shows predominately the first type of activity in its response to a noxious stimulus before showing the aggressive reaction, that is, the infant first attempts to retreat from a noxious stimulus and follows this mode of adjustment by an aggressive reaction in case the first response does not suffice for an adjustment. The retreating response which precedes the aggressive reaction is noted in the activity following restraint and sticking with a needle. The newborn infant attempts, for example, to pull its head and shoulders away when restraint is applied to the face. If the restraint is continued, aggressive movements follow, such as throwing the arms and legs about and pushing motions with the hands and arms. The infant at ten or twelve days also shows this mode of reaction to restraint of the face, except that the time period during which it attempts to retreat is much shorter, and unless looked for, is often not observed. It may be ventured that the aggressive reaction which follows immediately upon the application of a noxious stimulus in older infants, so that the initial period of retreat cannot be observed, is in reality a conditioned response, that is, the infant is so conditioned by the repetition of noxious stimuli that it reacts to them by an immediate aggressive mode of response. As will be pointed out later, the conditioning of the emotional responses goes on continually, and the reactions to specific stimulating conditions are often considerably altered with the increase of age and experience.

The emotional responses of the adult are also characterized by an attempt at an adjustment to a specific stimulus. The emotions of an adult are usually differentiated not by the peculiar organic activity involved, nor by a specific facial expression, but only on the basis of the differences in the adjustment of the body in relation to the stimulating condition. During an anger response, for example, there is an aggressive reaction towards the stimulus, involving muscular activity and a sudden mass activity of the body. The organic activity of such a reaction requires a quickened heart rate, a rise in blood pressure, and so on. During the response which is termed the emotion of fear there is a mass reaction characterized by a retreat from the stimulating condition, and the gross bodily activity is necessarily different from that of anger, although the organic responses may be similar.

Changes in the mode of response to a specific situation are also seen in adults when a particular form of response does not suffice for the individual's adaptation. The change from fear to anger, for example, is often seen in the responses of both animals and humans to a dangerous situation, and again illustrates that the particular emotion employed depends directly upon the adjustment necessary for the specific stimulating circumstance. In animals one often notes an initial fear response accompanied by flight, but when the animal

is "brought to bay," that is, when the flight no longer serves to adjust the animal to the stimulating condition, the fear response changes to one of anger and the animal changes the retreating reaction to one of aggressiveness. Similar changes from one emotional activity to another are also frequently noted in humans in whom a change from anger to fear, or vice versa, occurs, depending upon the adjustive adequacy of the initial emotional reaction. This illustrates again that the emotional response depends upon the type of adaptive activity which the individual finds necessary in his adjustment to a specific stimulating circumstance. Two boys enter into a street fight, both very angry and both expecting to be the victor. During the fighting one boy looks around, perhaps calls for help, turns, and runs away. The anger which was accompanied by fighting did not serve him well and changed to a fear reaction which necessitated flight from the situation.

The emotional responses are conditioned gradually with the increase in the age of the individual so that the reactions of the adult are usually not as overtly manifested as those of the infant or child. The adult has conditioned his emotional responses so that a situation which originally called out a certain response in his childhood may later call out a totally different reaction. He also learns to control his emotional behavior in certain situations and the overt activity which would ordinarily characterize the emotion is therefore inhibited. The individual learns, for example, to inhibit his overt behavior in a public place, or in situation which would involve future detrimental consequences. The emotional reactions in any particular situation are dependent upon the specific stimuli tending to call out a response and upon the past experience of the individual.

## 6. HOW SOME EMOTIONS CHANGE<sup>12</sup>

*John B. Watson*

Our first experiment with Albert had for its object the conditioning of a fear response to a white rat. We first showed by repeated tests that nothing but loud sounds and removal of support would bring out a fear response in this child. Everything coming within twelve inches of him was reached for and manipulated. His reaction, however, to a loud sound was characteristic of what occurs with most children. A steel bar, about one inch in diameter and three feet long, when struck with a carpenter's hammer produced the most marked kind of reaction.

Our laboratory notes showing the progress in establishing a conditioned emotional response are given here in full:

Eleven months, 3 days old. (1) White rat which he played with for weeks was suddenly taken from the basket (the usual routine) and presented to Albert. He began to reach for rat with left hand. Just as his hand touched the animal the

<sup>12</sup>From John B. Watson, "Recent Experiments on How We Lose and Change Our Emotional Equipment." *The Pedagogical Seminary and Journal of Genetic Psychology*, 32, 1925, pp. 342-345.



bar was struck immediately behind his head. The infant jumped violently and fell forward, burying his face in the mattress. He did not cry, however.

(2) Just as his right hand touched the rat the bar was again struck. Again the infant jumped violently, fell forward and began to whimper.

On account of his disturbed condition no further tests were made for one week.

Eleven months, ten days old. (1) Rat presented suddenly without sound. There was steady fixation but no tendency at first to reach for it. The rat was then placed nearer, whereupon tentative reaching movements began with the right hand. When the rat nosed the infant's left hand the hand was immediately withdrawn. He started to reach for the head of animal with the forefinger of his left hand but withdrew it suddenly before contact. It is thus seen that the two joint stimulations given last week were not without effect. He was tested with his blocks immediately afterwards to see if they shared in the process of conditioning. He began immediately to pick them up, dropping them and pounding them, etc. In the remainder of the tests the blocks were given frequently to quiet him and to test his general emotional state. They were always removed from sight when the process of conditioning was under way.

(2) Combined stimulation with rat and sound. Started, then fell over immediately to right side. No crying.

(3) Combined stimulation. Fell to right side and rested on hands with head turned from rat. No crying.

(4) Combined stimulation. Same reaction.

(5) Rat suddenly presented alone. Puckered face, whimpered and withdrew body sharply to left.

(6) Combined stimulation. Fell over immediately to right side and began to whimper.

(7) Combined stimulation. Started violently and cried, but did not fall over.

(8) Rat alone. The instant the rat was shown the baby began to cry. Almost instantly he turned sharply to the left, fell over, raised himself on all fours and began to crawl away so rapidly that he was caught with difficulty before he reached the edge of the mattress.

Surely this proof of the conditioned origin of a fear response puts us on a natural science grounds in our study of emotional behavior. It is a far more prolific goose for laying golden eggs than is James' barren verbal formulation. It yields an explanatory principle that will account for the enormous complexity in the emotional behavior of adults. We no longer in accounting for such behavior have to fall back upon heredity.

*The spread or transfer of conditioned responses.*—Before the above experiment on the rat was made, Albert had been playing for weeks with rabbits, pigeons, fur muffs, the hair of the attendants and false faces. What effect will conditioning him upon the rat have upon his response to these animals and other objects when next he sees them? To test this we made no further experiments upon him for five days. That is, during this five-day period he was not allowed to see any of the above objects. At the end of the sixth day we again tested him first with the rat to see if the conditioned fear response to it had carried over. Our notes are as follows:

Eleven months, fifteen days old.

(1) Tested first with blocks. He reached readily for them, playing with them as usual. This shows that there has been no general transfer to the room, table, blocks, etc.

(2) Rat alone. Whimpered immediately, withdrew right hand and turned head and trunk away.

(3) Blocks again offered. Played readily with them smiling and gurgling.

(4) Rat alone. Leaned over to the left side as far away from the rat as possible then fell over, getting up on all fours and scurrying away as rapidly as possible.

(5) Blocks again offered. Reached immediately for them, smiling and laughing as before.

This shows that the conditioned response was carried over the five-day period. Next we presented in order a rabbit, a dog, a sealskin coat, cotton wool, human hair and false face:

(6) Rabbit alone. A rabbit was suddenly placed on the mattress in front of him. The reaction was pronounced. Negative responses began at once. He leaned as far away from the animal as possible, whimpered, then burst into tears. When the rabbit was placed in contact with him he buried his face in the mattress, then got up on all fours and crawled away, crying as he went. This was a most convincing test.

(7) The blocks were next given to him, after an interval. He played with them as before. It was observed by four people that he played far more energetically with them than ever before. The blocks were raised high over his head and slammed down with a great deal of force.

(8) Dog alone. The dog did not produce as violent a reaction as the rabbit. The moment fixation of the eyes occurred the child shrank back and as the animal came nearer he attempted to get on all fours but did not cry at first. As soon as the dog passed out of his range of vision he became quiet. The dog was then made to approach the infant's head (he was lying down at the moment). Albert straightened up immediately, fell over the opposite side and turned his head away. He then began to cry.

(9) Blocks were again presented. He began immediately to play with them.

(10) Fur coat (seal). Withdrew immediately to the left side and began to fret. Coat put close to him on the left side, he turned immediately, began to cry and tried to crawl away on all fours.

(11) Cotton wool. The wool was presented in a paper package. At the ends the cotton was not covered by the paper. It was placed first on his feet. He kicked it away but did not touch it with his hands. When his hand was laid on the wool he immediately withdrew it but did not show the shock that the animals or fur coat produced in him. He then began to play with the paper, avoiding contact with the wool itself. Before the hour was up, however, he lost some of his negativism to the wool.

(12) Just in play W., who had made the experiments, put his head down to see if Albert would play with his hair. Albert was completely negative. The other two observers did the same thing. He began immediately to play with their hair. A Santa Claus mask was then brought and presented Albert. He was again pronounced negative, although on all previous occasions he had played with it.

7. EMOTIONAL DEVELOPMENT DURING ADOLESCENCE<sup>13</sup>*F. D. Brooks*

*Emotional maturity.*—Emotional maturity refers to the stage of development of an individual's emotional life as compared with that of others who are older, younger, and of the same age. Accordingly, we may speak of an adolescent (or an adult) as making a childish emotional reaction; or we note that another is normal or quite mature in his emotional responses. We must remember, however, that the terms, emotional development and maturity, may suggest more precise and valid means of appraising emotional behavior than we really do possess. As a matter of fact we have, thus far, no means of accurately determining the emotional changes that take place from one year to the next. Accordingly, we do not have valid reliable data from which to draw growth curves showing the emotional development of the adolescent. Our use of the terms implies no greater precision than comes from careful observation.

*The emotional maturing of the adolescent boy.*—By the time puberty is reached the boy normally has experienced many emotions, as pity, sympathy, joy, grief, regret, jealousy, worry, embarrassment, gratitude, admiration, surprise, and the like. He has acquired considerable control of his emotions, and has passed the stage of their crude childish expression. He should have a certain stability. He has lost his fear of many objects and events of his surroundings which at one time evoked this emotion, and his development during the teens is likely to continue still further in the same direction. Likewise, he has learned to curb anger, and can meet thwarting with less internal commotion. He usually makes considerable progress during adolescence in controlling this strong emotion. Of course, his development may not have been normal. The education and training of the emotional disposition of the child are often neglected, frequently are ineffective, and many times are positively harmful. Some children seem to be less stable at the close of adolescence than at its beginning, but, fortunately, they are the small minority.

If the boy's development has been normal, the early and almost complete domination of affection for his mother has been modified, so that his father, and then his playmates (mostly boys), have come to have an increasingly important role in his life. By the time of puberty the gang has come to hold a large place in his life, and group opinion has become a powerful force, whose strength is destined to increase during the teens. During adolescence the boy's affection naturally becomes heterosexual. However, over-fond mothers sometimes continue to bestow infantile attention and affection upon the boy, and consciously or unconsciously maintain such a firm hold upon his affections as prevents the normal changes indicated above and thereby interferes with his emotional maturing.

<sup>13</sup> From F. D. Brooks, *The Psychology of Adolescence*. Boston: Houghton Mifflin Company, 1929, pp. 227-230.

A domineering father, too, may be so cold and fear-inspiring that the pre-adolescent boy does not have the affection for him that he normally should and would have. Then, too, a busy father often sees so little of his son, and has no time for that companionship which is worth so much to the boy—a companionship which gives the father a sympathetic understanding of his son and provides the boy with a desirable outlet for his affection. Such companionship of father and son leaves ample room for friendship and association with other boys; it lays a good foundation for that mutual trust, respect, and sympathetic understanding which are so valuable as the boy grows older and has to meet the many problems of adolescence—especially those relating to sex emotions and impulses and the prevention of too early fixation of affection upon someone of the opposite sex.

In general, emotional development during adolescence is very largely a continuation of a development which began long before puberty. Yet it is undoubtedly true that adolescence presents its own characteristic changes, as we would expect on account of the widening of life's experiences, the development of intellectual and other powers, and the greater strength of certain emotions and impulses. The youth's emotional tendencies are being modified and fitted into that total organization of traits known as personality.

*The emotional maturing of the adolescent girl.*—The girl's development of emotional control resembles that of the boy, in many respects. Similar modifications of childish responses normally take place. By the beginning of puberty she normally has progressed far in controlling the emotions which she has experienced from early childhood. Modifications and consolidations with other tendencies have proceeded apace. Her emotional reactions are being rapidly organized into her total-conduct series. She has yet to face the problems arising from the strong sex impulses and emotions of the teens. If her life has been free from morbid fears and uncontrolled anger; if she has had opportunities for many-sided, vigorous self-expression; if she has not been too much repressed and has not had her freedom abnormally circumscribed by social pressure which often treats the girl unfairly; if she has been well physically and has been trained in responsibility and self-control during childhood; then she is well prepared to meet the developmental problems of the teens. We believe that the greater frequency of emotional disturbances among girls than among boys is partly due to differences in the environment. Custom still gives the boy more freedom, fewer "don'ts," and more opportunities for many-sided, active self-expression.

A girl is sometimes jealous of her father's affection for the mother, and has some difficulties of adjustment on account of it. Normally her affections come to include girl friends, and during adolescence become strongly heterosexual.

Sympathetic understanding and control, frank recognition and discussion of problems as they arise, and other features of wise guidance and control help the adolescent girl to attain womanhood with a maximum advantage from her modified emotional equipment, and with few really bothersome emotional conflicts.

## III. Studies in the Control of Emotion

I. A LABORATORY STUDY OF FEAR<sup>14</sup>*Mary Cover Jones*

Peter was two years and ten months old when we began to study him. He was afraid of a white rat, and this fear extended to a rabbit, a fur coat, a feather, cotton wool, etc., but not to wooden blocks and similar toys. An abridgment of the first laboratory notes on Peter reads as follows:

Peter was put in a crib in a play room and immediately became absorbed in his toys. A white rat was introduced into the crib from behind. (The experimenter was behind a screen.) At sight of the rat, Peter screamed and fell flat on his back in a paroxysm of fear. The stimulus was removed, and Peter was taken out of the crib and put into a chair. Barbara was brought to the crib and the white rat introduced as before. She exhibited no fear but picked the rat up in her hand. Peter sat quietly watching Barbara and the rat. A string of beads belonging to Peter had been left in the crib. Whenever the rat touched a part of the string he would say "my beads" in a complaining voice, although he made no objections when Barbara touched them. Invited to get down from the chair, he shook his head, fear not yet subsided. Twenty-five minutes elapsed before he was ready to play about freely.

The next day his reactions to the following situations and objects were noted:

Playroom and crib.....	Selected toys, got into crib without protest
White ball rolled in.....	Picked it up and held it
Fur rug hung over crib.....	Cried until it was removed
Fur coat hung over crib.....	Cried until it was removed
Cotton .....	Whimpered, withdrew, cried
Hat with feathers.....	Cried
Blue woolly sweater.....	Looked, turned away, no fear
White toy rabbit of rough cloth.....	No interest, no fear
Wooden doll .....	No interest, no fear

... The first problem was that of "unconditioning" a fear response to an animal, and the second, that of determining whether unconditioning to one stimulus spreads without further training to other stimuli.

From the test situations which were used to reveal fears, it was found that Peter showed even more marked fear responses to the rabbit than to the rat. It was decided to use the rabbit for unconditioning and to proceed as follows: Each day Peter and three other children were brought to the laboratory for a play period. The other children were selected carefully because of their entirely fearless attitude toward the rabbit and because of their satisfactory adjustments in general. The rabbit was always present during a part of the play period. From time to time Peter was brought in alone so that his reactions could be observed and progress noted.

<sup>14</sup> From Mary Cover Jones, "A Laboratory Study of Fear: The Case of Peter." *Pedagogical Seminary*, 31, 1924, pp. 309-311.

From reading over the notes for each session it was apparent that there had been improvement by more or less regular steps from almost complete terror at sight of the rabbit to a completely positive response with no signs of disturbance. New situations requiring closer contact with the rabbit had been gradually introduced and the degree to which these situations were avoided, tolerated, or welcomed, at each experimental session, gave the measure of improvement. Analysis of the notes on Peter's reactions indicated the following progressive steps in his degrees of toleration.

- A. Rabbit anywhere in the room in a cage causes fear reactions.
- B. Rabbit twelve feet away in cage tolerated.
- C. Rabbit four feet away in cage tolerated.
- D. Rabbit three feet away in cage tolerated.
- E. Rabbit close in cage tolerated.
- F. Rabbit free in room tolerated.
- G. Rabbit touched when experimenter holds it.
- H. Rabbit touched when free in room.
- I. Rabbit defied by spitting at it, throwing things at it, imitating it.
- J. Rabbit allowed on tray of high chair.
- K. Squats in defenseless position beside rabbit.
- L. Helps experimenter to carry rabbit to its cage.
- M. Holds rabbit on lap.
- N. Stays alone in room with rabbit.
- O. Allows rabbit in play pen with him.
- P. Fondles rabbit affectionately.
- Q. Lets rabbit nibble his fingers.

## 2. METHODS OF OVERCOMING FEARS<sup>15</sup>

*Arthur T. Jersild and Frances B. Holmes*

A large number of children's fears are "outgrown" in the normal course of the child's growth and experience. The fears most likely to wane, without special guidance, as the child grows older and abler are fears in response to concrete, tangible events, such as noises, strange objects, persons and situations, events associated with sudden or unexpected movement, or with pain or tactual shock. The fears less likely to "disappear of themselves" are fears of animals; of fancied and remote dangers; of dangers associated with darkness, imaginary creatures, and superstitions; calamities that might occur, although there is no immediate danger; and anxieties regarding personal failures and shortcomings. The testimony of older children and adults alike shows, however, that fears of the former as well as of the latter description are likely to persist into adult years in the case of a large number of persons when they are left to their own resources.

The nature of children's fears, and the evidence regarding the degree to which the usual child's fears are influenced by the unwitting or deliberate

<sup>15</sup>From Arthur T. Jersild and Frances B. Holmes, "Methods of Overcoming Children's Fears." *The Journal of Psychology*, 1, 1935, pp. 101-103.

activities of other children and adults, indicate that there is room for much preventative work. Although it is recognized that fear, even though seemingly more intense than is "necessary," may serve a useful purpose in safeguarding an individual from harm and indiscretion, it still appears that many of the fears entertained by a large number of "normal" persons may be regarded as more of a burden than as a help in the economy of living. It must also be recognized, however, that a thoroughgoing program of fear-prevention would be difficult to achieve. One major hindrance is the impossibility of foreseeing and controlling all of the peculiar conditions that might happen to frighten a given child, but there still are many opportunities to help the usual child to overcome his current fears and to help him to be forearmed against other fears that might develop in the future.

Among the factors that may be helpful in the prevention of fears (as distinct from the overcoming of fears that already have been displayed) are the following: provision of a partial introductory experience—graded introduction of the possibly frightening event; abstaining from showing signs of fear in the child's presence; giving the child ample opportunity for growing accustomed to an event (such as darkness, strange situations, objects and persons) while he still is relatively immune to fear by reason of his immaturity and lack of discrimination; avoidance of the use of fear stimulation as means of discipline, intimidation or wanton amusement; prior explanation and assurance; previous direct, but, preferably, indirect, forewarnings; setting an example of fearlessness; promoting skills that enable the child to cope with conditions that might otherwise frighten him; promoting knowledge and understanding, through casual conversation and instruction, in an effort to anticipate distorted impressions and fancies that the child may acquire from stories and pictures and lurid tales told to him by others.

Steps taken to forestall fear are likely to be more effective if introduced unobtrusively and as a functional part of other projects and topics than if an abrupt or direct approach is employed.

The most effective techniques in overcoming fears are those that *help the child to become more competent and skillful and that encourage him to undertake active dealings with the thing that he fears*. There are several methods that may be employed, either alone or, preferably, in combination with one another. Among the most helpful techniques are the following:

- (1) Prompting the child to acquire skills that may be of specific aid to him in coping with the feared situation.
- (2) Leading the child by degrees into active contact with and participation in the situation that he fears: presenting the stimulus at first in a less intense form, or without some of its most frightening features, or in conjunction with reassuring features, and then gradually introducing all of the conditions that initially evoked fear.
- (3) Giving the child an opportunity to become acquainted with the feared stimulus on his own accord, by making it readily accessible to him in his normal environment, but under circumstances that permit him to

inspect or ignore it, approach or avoid it, as he sees fit. (It is obvious that these conditions cannot be met in the case of some things that frighten the child.)

The following techniques are also sometimes effective when used alone, but they are more useful when employed as auxiliary methods:

- (4) Verbal explanation and reassurance.
- (5) Verbal explanation and reassurance plus a practical demonstration of the nature and harmlessness of the thing that is feared.
- (6) Setting an example of fearlessness in the child's presence.
- (7) Efforts to effect "positive reconditioning" by presenting the feared stimulus in association with an attractive stimulus.

The foregoing four methods (which in practice are likely to overlap with one another and with other methods here reviewed) will usually be most helpful if employed not merely as academic means of establishing pleasant associations with the feared event, or of convincing a passive child that there is no danger, but as supplementary aids in bringing the child into active working relations with the thing that is feared.

The following techniques, when used exclusively, are quite ineffective:

- (8) Ignoring the child's fears.
- (9) Coercing the child into contact with the feared situation by means of physical force, scoldings, ridicule, or invidious comparison.
- (10) Completely removing the cause of fear for the time being, or offering palliatives for the child's symptoms of fear.

### 3. ANGER<sup>16</sup>

*Florence L. Goodenough*

Although, because of the small number of cases involved, the data that have been presented in the foregoing chapters should be substantiated by further investigation, it is believed, nevertheless, that they represent a decided advance over previous studies of anger in children in which memory alone has been relied upon to provide an account of the subject's behavior and of the circumstances accompanying it. We have shown that at least so far as methods of control are concerned there is but slight relationship between responses made in answer to questionnaires and the actual records of behavior made by the same individuals, even when, as in the present instance, the willingness of the respondents to co-operate in the project may fairly be taken as evidence of the intention to give an honest report. Although no claim for complete accuracy of report is offered, it is believed that the records have been carefully made. It is also believed that the observations upon which the records are based would compare well in precision with those reported in

<sup>16</sup> From Florence L. Goodenough, *Anger in Young Children*. Minneapolis: The University of Minnesota Press, 1931, pp. 244-249.



similar fields where the facts to be observed are not yet completely determined or defined and the behavior patterns are changing so rapidly that an observer can receive only a confused and kaleidoscopic impression of the whole.

The conclusions given here must therefore be regarded as tentative only. If the data are taken at their face value, however, the following trends and relationships are suggested:

(1) The frequency with which overt manifestations of anger are displayed by children appears to reach a maximum during the second year of life and to fall off rapidly thereafter. After the second year anger is shown more frequently and in a more violent manner by boys than by girls. However, at all ages individual differences among members of the same sex greatly exceed the average difference between the sexes.

(2) With advancing age behavior during anger becomes more overtly directed toward a given end. At the same time the primitive bodily responses of the infant and young child gradually become replaced by substitute reactions of a somewhat less violent and more symbolic character. As age advances, the proportion of outbursts in which the behavior consists only or chiefly of simple displays of undirected energy decreases, while the frequency of retaliative behavior increases. There are more evidences of persisting generalized reactions toward a single person and more attempts to retaliate by means of indirect attacks designed to hurt the feelings rather than to injure the body of the offender. The percentage of observable after reactions, particularly resentfulness and sulkiness increases steadily with advancing age.

(3) The duration of the anger outbursts shown by children undergoes very little change with age during the first eight years. Among our cases duration appears to be more closely related to the circumstances under which the behavior occurs and to the manner in which it is handled than to the nature of the difficulty that constitutes the immediate stimulus. However, because of the impossibility of assigning a quantitative value to the stimulus by any methods at present available, this statement must be interpreted with much caution. Of the 1,878 outbursts reported for our subjects, fewer than a third persisted for as long as five minutes.

(4) A decided relationship between the health of the child and the frequency with which anger is displayed is shown by our data. Any temporary condition of imperfect health, such as a slight cold, tends to increase the frequency of outbursts over that reported on days when health is said to be normal. Outbursts are also more frequent when the child is constipated than when his bowels are in a normal condition. Among children in process of training for nocturnal bladder control outbursts are almost twice as frequent on days following nights when the bed was wet as on days following dry nights.

(5) Children who have suffered one or more previous illnesses of at least moderate severity display anger more frequently than others of their age and sex whose previous health has been uniformly good. This is in agreement with Stratton's findings for college students. According to Stratton the

relationship between anger and the incidence of previous diseases is strongest when the illness occurred before the age of six. Our data show that during periods of illness children are much more likely to get their own way by means of an outburst of anger than when health is said to be normal. This may provide at least a partial explanation for the relationship.

(6) A positive relationship exists between the number of adults in the household and the frequency with which anger is shown by children.

(7) There is marked diurnal variation in the frequency with which anger is shown. The peaks in the curve tend to occur shortly before the meal hours. This is in agreement with Gates's findings for college students.

(8) The methods of control used by parents vary somewhat with the age and sex of the child. As age advances, the use of physical force, coaxing, diversion of attention, and ignoring the outburst diminishes, while the use of scolding, threatening, and isolation increases. Among our cases bribery, spanking, threatening, and isolation are more often reported for boys than for girls, while ignoring the outburst is more often reported for girls than for boys. The use of reasoning shows very little change with age.

(9) The number of shifts from one attempted method to another varies directly with the duration of the outburst and with the violence of the child's behavior.

(10) As age advances, the issue is less frequently yielded *in toto*, while the frequency of compromise solutions increases with age.

(11) "Giving the child his own way" is reported much more frequently for children who have many outbursts than for those who have few.

(12) Although a comparison of the methods of control used by parents of children who have many outbursts with those most often reported by the parents of children who have few suggests that certain methods are in general to be preferred to others, an examination of the records as a whole makes it appear fairly certain that there are wide variations in the manner with which any given method is used and that these variations within a so-called single method frequently exceed in quality and effectiveness the difference between methods bearing different labels. Some objective evidence for this conclusion is provided in the fact that, whatever the method of control reported, children who have frequent outbursts of anger show a higher percentage of occasions when resentful or sullen behavior is apparent after the overt outburst ceases. This suggests that the methods, whatever they may be, have been used more effectively by certain parents than by others.

(13) A subjective judgment of the total home situation secured by a consecutive reading of all records for each child leads to the conclusion that the control of anger in children is best achieved when the child's behavior is viewed with serenity and tolerance, when the standards set are within the child's ability to achieve, and when these standards are adhered to with sufficient consistency to permit the child to learn through uniformity of experience, without such mechanical adherence to routine that the child's emotional or physical well-being is sacrificed to the demands of an inflexible schedule. How-

ever, when departures from the established schedule are made, they should be determined by a recognition of the needs of the child and not simply by the convenience or mood of adult in charge. Self-control in the parents, is, after all, likely to be the best guarantee of self-control in the child.

#### 4. JEALOUSY<sup>17</sup>

*John B. Watson*

Take the child's jealous behavior next. The first sign of jealousy was noted in child B at about two years of age. It shows whenever the mother embraces the father, clings to him, kisses him. At two and one-half years of age this child who had never been made the "scapegoat," who had always been allowed to be present and even welcomed into the family love-making, begins to attack the father whenever the mother embraces the father. He (1) pulls at his coat, (2) cries out "my mamma," (3) pushes his father away and crowds in between them. If the kissing continues, the child's reaction state becomes very marked and intense. Always in the morning—Sundays especially, when he comes in the bedroom before his parents are up—he is taken up and welcomed and made much of by both. And yet at two and three-fourths years of age he would say to his father, "You going to office dada?"—or else give the direct command, "You go office dada." At three years of age this boy was sent with his infant brother to his grandmother's, in charge of a nurse. He was separated from his mother for one month. During this time his strong attachment for his mother weakened. When the parents visited the child (then thirty-seven months of age), no jealous behavior was exhibited when they made love in front of him. When the parents clung together for a considerable time, to see if jealous behavior would finally occur, he merely ran up and hugged first one and then the other. This test was repeated for four days with the same results.

The father then seeing that the old situation failed to call it out, tried next attacking the mother, striking her on the body and head and shaking her from side to side. She on her part simulated crying, but fought back. The youngster stood this for a few minutes, then started in for his father tooth and nail and would not let up until the fight was over. He cried, kicked, tugged at his father's leg and struck with his hand.

Next the father remained passive while the mother attacked him. She inadvertently punched below the belt, causing the father to double up in no simulated way. Nevertheless, the youngster started his attack on his father again and continued it even after he was *hors de combat*. By this time the youngster was genuinely disturbed and the experiment had to be discontinued. The next day, however, no jealous behavior was exhibited when mother and father embraced.

<sup>17</sup> From John B. Watson, "Recent Experiments on How We Lose and Change Our Emotional Equipment." *The Pedagogical Seminary and Journal of Genetic Psychology*, 32, 1925, pp. 367-368.

*How early does this form of jealousy against one or the other parent occur?*—To further test the genesis of this type of jealous behavior, a test was made upon an eleven-months-old infant boy. This infant was well nourished and wholly without conditioned fears, yet there was a strong attachment for the mother, but none for the father who often spanked his hand when he attempted to suck his thumb and otherwise broke in upon his quiet by trying various types of experiments. At eleven months he could crawl quickly and for considerable distances.

When father and mother violently embraced, the youngster could not be made to keep his eyes on his parents. Love making between them was nothing in his young life. This was tested again and again. There was no tendency to crawl towards them, much less to crawl in between them. Jealousy was absent.

Next the father and mother attacked one another. The floor was carpeted, and the noise of the blows and the low whimper of the mother (or father in turn) were not very loud. The fight immediately stopped his crawling about, brought prolonged fixation—always of the mother and never of the father. As it continued, he whimpered and cried out aloud several times but made no effort to enter the fight on either side. The noises, shaking of the floor, and the sight of the parents' faces—which offered the same visual stimulus to him when he himself got slapped and was made to cry—were sufficiently complex stimuli to call out the observed behavior. His behavior was of the fear type partly visually conditioned. There was apparently no jealousy behavior in this infant, either when its parents made love or when either parent attacked the other. Eleven months seems to be too tender an age for jealousy to appear.

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## EXERCISES

1. Distinguish between *emotion* and the *emotions*.
2. What is the significance of the problem as to whether or not there are any native emotions?
3. Indicate the value for parent and teacher of an understanding of the physiology of emotion.
4. Discuss the bearing of emotional control on character development.
5. Cite examples indicating whether or not emotions like fear, anger, jealousy, or envy have any adaptive value for human beings.
6. What is the difference, if any, between controlling emotion and repressing emotion?
7. Is there any relationship between emotional control and intelligence? Discuss fully.
8. Is emotional control always desirable? Why or why not?
9. If a child is trained in emotional control, is it liable to develop into an apathetic personality? Be prepared to support your position on this question.
10. What are the symptoms of emotional instability in a child?
11. The simpler and more primary feelings and emotions may become related with aesthetic, social, moral, and religious sentiments. These "higher feelings" or "tutored behaviors" are very complex. Show how perceptual and judgment factors are involved. Trace the development of some sentiment such as "love of country" or "respect for the church."
12. To what extent, if at all, do the emotions enter into aesthetic responsiveness?
13. Take some typical emotional response of a child and show how it may be changed by the cognitive element.
14. What measures can you recommend for freeing oneself of an undesirable emotion?
15. What is the effect of strong emotions on the organism?
16. What relation have the emotions to character formation?

## CHAPTER X<sup>1</sup>

### WANTS, INTERESTS, ATTITUDES, APPRECIATION, IDEALS

*H. H. Remmers, Purdue University*

Wants, interests, attitudes, appreciation, ideals, character—these are concepts which have grown in importance in the last two or three decades. They have often been very loosely defined, sometimes so loosely as to be all but meaningless. A rapidly growing scientific, experimental literature in psychology and education is changing them from a priori philosophical concepts into operationally defined,\* *functional* concepts.

#### I. Introduction<sup>2</sup>

*E. L. Thorndike*

Common sense separates wants, interests, attitudes, and emotions roughly from sensations, percepts, images, and ideas, and from movements or acts, and psychologists often find it convenient to do so. The term *drive* is often used by them to refer to wants, interests, attitudes, and emotions when these are considered as active forces. . . .

In present-day psychology, little effort is made to divide a man's mind up into intellectual, emotional, and volitional functions. There are all sorts of combinations. A want often has imbedded in it an idea of what is wanted. An attitude of attentiveness consists partly of certain acts (movements and restraints from movements). The feelings of excitement and depression which are observable as components of certain emotions may be sensations arising from internal stimuli, as hunger does. It is, however, convenient to distinguish a want from a movement or act, an attitude toward a thing from a percept or image of it, an emotional state of enjoyment from a mere sensation of red or sour. And it is reasonable to do so provided nothing unreal is assumed.

In this volume we distinguish wants, interests, attitudes, and emotions from other facts in mental life, not in order to define them rigidly or to infer anything from the contrast but simply because we are to study them rather than

<sup>1</sup> The readings presented in this chapter are supplementary to the discussions in the following books: Griffith, *An Introduction to Educational Psychology*, Chapters II and IV; Skinner and Collaborators, *Educational Psychology*, Chapter IV; Powers and Uhl, *Psychological Principles of Education*, Chapter IV; Mursell, *Psychology of Secondary School Teaching*, Chapter VIII; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter XIII; Davis, *Psychology of Learning*, Chapters XII and XIII; Eurich and Carroll, *Educational Psychology*, Chapters VII and VIII; Averill, *Elements of Educational Psychology*, Chapters II and III; Pressey, *Psychology and the New Education*, Chapter IV; and Hollingworth, *Educational Psychology*, Chapter XVI.

\* See P. W. Bridgman, *The Logic of Modern Physics*, The Macmillan Company, 1927, for an important contribution to scientific thinking which is being applied very fruitfully to problems of psychology and education, i. e., that of operational definition of scientific concepts.

<sup>2</sup> From E. L. Thorndike, *The Psychology of Wants, Interests, and Attitudes*. New York: D. Appleton-Century Company, 1935, pp. 3-5.

sensations, images, ideas, inferences and their like, as bodily movements. The facts to be reported in this volume will be just as true if all the wants, interests, attitudes, and emotions with which we experiment are alloyed by sensory or ideational elements.

Our study is of the dynamics of wants, interests, attitudes, and emotions. It is concerned with what they do and what is done to them, that is, with the changes which they produce and the changes which are produced in them. They obviously have great potency in directing the course of ideas and acts. Thought and action occur largely in the service of wants, interests, and attitudes and are stimulated and guided by them. . . .

A want, attitude, or interest may conveniently be considered as quiescent, latent or potential, and as active or kinetic. So infants potentially want food, bodily exercise, and sensory experience even when they are asleep; but these cravings are active only under special conditions. Our concern is naturally with their active forms. The active want, interest, or attitude may be considered as a force by itself or as a fraction more or less of the total dynamic system of the person at the time. The former line of thought is commonly the more useful for science, though certain combinations and co-operations of these forces require study. In the ordinary flow of life, however, animals, especially civilized man, are often moved by a complex of active wants.

The influence of an acting want, interest, or attitude is two fold. It works forward to evoke, then and there, behavior which the animal would not have displayed except for the presence of the acting want. It also works backward, so to speak, to alter the nature of the animal so that the animal is, from then on, different from what he was before and will behave differently. It works forward by virtue of the special potencies or tendencies with which nature or nurture has endowed it to evoke this, that, or the other consequence. So active hunger makes an infant suck under certain conditions; active interest in exploration or food-getting makes the rat sniff at and enter an alley new to him. It works backward in little-known ways which we must investigate with care, but with the general result that the animal is changed so as to favor increasingly the connections which satisfied the want or interest. The child comes to suck the nipple, and with movements which secure food better. The rat exploring for food comes to enter the food box or alleys that lead thereto rather than go past the food-box entrance or into blind alleys.

Wants, attitudes, and interests not only influence behavior and modify the behavior of organisms, they also are themselves changed. They are strengthened and weakened by the course of inner development and by the experiences of life. They may be shifted in respect of their attachments so that different situations call them forth.

II. The Place of Attitudes in Educational Outcomes<sup>3</sup> \*

H. H. Remmers

That attitudes are presumably closely associated with overt behavior is attested by both scriptural and profane writings. "As a man thinketh in his heart, so is he" finds its modern counterpart in current educational philosophy as exemplified in statements of educational objectives. Such expressed aims as "worthy home membership," "worthy use of leisure," "citizenship," and the omnibus concept of "character" require no detailed analysis or argument to show them as heavily loaded with what may conveniently be called attitudes. The assumption of the psychological validity of this proposition is clearly evident at the present time in the educational procedures in Italy, Germany, and Russia where public education as a propaganda arm of government is explicit. No education in any organized modern society, we submit, can afford to neglect attitudes as outcomes of the educational processes with which it concerns itself. Putative democracies as well as dictatorships of whatever sort must recognize and deal with the problem if they expect to control individual and social behavior to the end of their own survival. Whatever our social and educational philosophy, attitudes as objectives cannot be ignored.

An attitude may be defined as an emotionally toned idea or a complex of ideas which constitutes the dynamics of action. There is much confusion in the literature in the use of the term "attitudes." Fundamentally this confusion inheres in two ways of conceiving attitudes. The least fruitful way of conceiving an attitude is as an abstraction which probably has no counterpart in psychological reality. For example, to say that an individual has a "scientific attitude" or a "liberal attitude" comes to have meaning only when the *attitude object* is brought into the context. One is not scientific or liberal in general and in the abstract. One has a scientific or liberal attitude *toward* the theory of organic evolution, the United States Supreme Court decision on the TVA, or social phenomena. In a word, from the point of view of a science of education, attitudes must be operationally defined.

It is necessary to make this point because only as measurement is possible can a science of education be possible. And attitudes as objectives of education can be knowingly achieved only to the extent that they are measurable.

At this point a series of postulates which are basic to a scientific treatment of attitudes as objectives is in order.

(1) Attitudes are the dynamics of human actions, and as such they have high importance, in all individual or group actions that concern society or the individual in society.

<sup>3</sup> From H. H. Remmers, "The Place of Attitudes in Educational Outcomes." *Reconstructing Education Through Research, Official Report*, 1936, American Educational Research Association, pp. 181-184.

\* Experimental studies of the effect of various educational procedures upon attitudes are being carried on at Purdue University with the aid of a grant from the Josiah Macy Junior Foundation.



(2) Educational procedures, curriculum content, and experience in general can and do change attitudes.

(3) To know whether attitudes as educational objectives are being achieved they must be measured.

(4) The extent to which various factors influence attitude can be measured experimentally.

(5) Attitudes as entities are insufficiently defined at present for satisfactory measurement of them. Operational definitions are necessary, that is, definitions in terms of a measuring instrument used to measure the function in question. . . .

There is a growing amount of criticism of education to the effect that the schools have been behaving as if human beings were intellectual machines activated by pure reason. Poets, artists, religious leaders, and political leaders have long known that this is a fallacy and modern psychology has impressively demonstrated the same thing. "Our intellect," once said G. Stanley Hall, "is a mere speck afloat on a sea of feeling." No one will deny the tremendous importance of this speck of intellect, but to neglect the currents, crosscurrents, and tides upon which it floats, to neglect the possible corrosive effect on the intellect of the medium in which it floats, to neglect the possible chemical changes, as it were, brought about by this speck's immersion in this ocean—this neglect cannot safely be continued if we are at all concerned about the "perdurance of American society," to use the phrase of the Commission on the Social Studies.

Real thinking has doubtless been vastly overestimated as to the frequency with which it occurs either individually or collectively. Even a cursory analysis of the type of appeals of leaders of various sorts would show that these appeals are much more frequently to feeling than to thinking. The biological classification of the human animal must take cognizance not only that he is *homo sapiens* but also *homo patiens*.

The system of morals which governs any given group or society can be truly said to be constituted of a matrix of attitude patterns which constitute the "flywheel of society," to use the phrase made familiar by William James with reference to habit. To the extent that these attitude patterns function in the lives of individuals in society without creating undue stresses and strain, to this extent will they constitute characteristics of a society which is stable with respect to its aims and purposes. Education must therefore be fundamentally concerned with producing the types of attitude patterns which from this point of view are desirable, since they constitute the integrating forces in society.

At this point the critical thinker may raise a question of whether all of the foregoing does not imply a system of indoctrination rather than of education. These two words have acquired connotations which are themselves charged with feeling, and an analysis of them in the present context is prohibited by the limitations of space and time. A few dogmatic statements must suffice. We as educators have paid extended lip service to the slogan that children must be taught how to think but not what to think. It is my conviction

that this slogan contains a fundamental self-contradiction. Thinking does not occur in the abstract or in a vacuum but proceeds in terms of the experiential background and existing attitude patterns present in the individual, and in the process of teaching how to think we will inevitably and necessarily to a considerable extent be teaching also what to think. From this point of view the "frame of reference" of the Commission on the Social Studies is certainly important. Psychologically, indoctrination and education cannot be separated. One of my most highly regarded friends and counselors has suggested that to say that we must not indoctrinate is itself indoctrination.

So far the discussion has concerned itself with the importance of attitudes from the standpoint of society. This was placed first because public education is primarily a system of social insurance, that is, insurance designed to achieve the purposes which society has formulated. From the standpoint of the individual, however, attitudes are no less important.

There is a rapidly growing recognition of this proposition in the area of education as subsumed under the phrase "mental hygiene." The functional psychoses are not only an index of undesirable strains and stresses in society; they have their origin in the attitude patterns of the individual. Hamlet's "For there is nothing either good or bad but thinking makes it so," from this point of view, states a profound truth. The individual's own evaluation of his conduct and desires in relation to the system of social values as he understands them constitutes the basis for social-emotional adjustment which may on the one extreme lead to a complete disintegration of the personality, or to a happy, effective, socialized individual at the other extreme—and there are of course all degrees between these two extremes. The individual's attitudes toward his associates, playmates, parents, teachers, institutions, customs—these basically condition his mental ease or his mental dis-ease. . . .

### III. Attitudes as a Form of Readiness <sup>4</sup>

*Gordon W. Allport*

Let us now consider a representative selection of definitions and characterizations of attitude.

[An attitude is] readiness for attention or action of a definite sort. (Baldwin, 1901-05)

Attitudes are literally mental postures, guides for conduct to which each new experience is referred before a response is made. (Morgan, 1934, p. 47)

Attitude = the specific mental disposition toward an incoming (or arising) experience, whereby that experience is modified, or, a condition of readiness for a certain type of activity. (*Dictionary of Psychology*, Warren, 1934)

An attitude is a complex of feelings, desires, fears, convictions, prejudices or

<sup>4</sup> From Gordon W. Allport, *Handbook of Social Psychology*, Carl Murchison (Ed.). Worcester: Clark University Press, 1935, Chapter 17, "Attitudes," pp. 804-805 and 809-810.

The references following each definition below are as given in the *Handbook of Social Psychology* (q.v.) and do not refer to those given at the end of this chapter.

other tendencies that have given a *set or readiness to act* to a person because of varied experiences. (Chave, 1928)

. . . a more or less permanently enduring state of readiness of mental organization which predisposes an individual to react in a characteristic way to any object or situation with which it is related. (Cantril, 1934a)

From the point of view of Gestalt psychology a change of attitude involves a definite physiological stress exerted upon a sensory field by processes originating in other parts of the nervous system. (Köhler, 1929, p. 184)

An attitude is a tendency to act toward or against something in the environment which becomes thereby a positive or negative value. (Bogardus, 1931, p. 62)

By attitude we understand a process of individual consciousness which determines real or possible activity of the individual counterpart of the social value; activity, in whatever form, is the bond between them. (Thomas and Znaniecki, 1918, p. 27)

The attitude, or preparation in advance of the actual response, constitutes an important determinant of the ensuing social behavior. Such neural settings, with their accompanying consciousness, are numerous and significant in social life. (F. H. Allport, 1924, p. 320)

An attitude is a mental disposition of the human individual to act for or against a definite object. (Droba, 1933)

[An attitude] denotes the general set of the organism as a whole toward an object or situation which calls for adjustment. (Lundberg, 1929)

[Attitudes] are modes of emotional regard for objects, and motor "sets" or slight, tentative reactions toward them. (Ewer, 1929, p. 136)

An attitude, roughly, is a residuum of experience, by which further activity is conditioned and controlled. . . . We may think of attitudes as acquired tendencies to act in specific ways toward objects. (Krueger and Reckless, 1931, p. 238)

When a certain type of experience is constantly repeated, a change of set is brought about which affects many central neurons and tends to spread over other parts of the central nervous system. These changes in the general set of the central nervous system temper the process of reception. . . . In terms of the subjective mental life these general sets are called attitudes. (Warren, 1922, pp. 360 f.)

An attitude is a disposition to act which is built up by the integration of numerous specific responses of a similar type, but which exists as a general neural "set," and when activated by a specific stimulus results in behavior that is more obviously a function of the disposition than of the activating stimulus. The important thing to note about this definition is that it considers attitudes as broad, generic (not simple and specific) determinants of behavior. (G. W. Allport, 1929)

We shall regard attitudes here as verbalized or verbalizable tendencies, dispositions, adjustments toward certain acts. They relate not to the past nor even primarily to the present, but as a rule, to the future. Sometimes, of course, it is a hypothetical future. . . . The "attitude" is primarily a way of being "set" toward or against things. (Murphy and Murphy, 1931, p. 615)

It is not difficult to trace the common thread running through these diverse definitions. In one way or another each regards the essential feature

of attitude as *a preparation or readiness for response*. The attitude is incipient and preparatory rather than overt and consummatory. It is not behavior, but the precondition of behavior. It may exist in all degrees of readiness from the most latent, dormant traces of forgotten habits to the tension or motion which is actively determining a course of conduct that is under way. . . .

*A definition of attitudes.*—It is not easy to construct a definition sufficiently broad to cover the many kinds of attitudinal determination which psychologists today recognize, and at the same time narrow enough to exclude those types of determination which are not ordinarily referred to as attitudes. The definitions considered above . . . contain helpful suggestions, and yet none alone is entirely satisfactory. The chief weakness of most of them seems to be their failure to distinguish between attitudes, which are often very general, and habits, which are always limited in their scope.

Any attempt at a definition exaggerates the degree of agreement which psychologists have reached, but is justified if it contributes toward securing greater agreement in the future. The following definition has the merit of including recognized types of attitudes: the *Aufgabe*, the quasi need, the *Bewusstseinslage*, interest and subjective value, prejudice, stereotype, and even the broadest conception of all, the philosophy of life. It excludes those types of readiness which are expressly innate, which are bound rigidly and invariably to the stimulus, which lack flexibility, and which lack directionality and reference to some external or conceptual object. *An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.*

#### IV. Measurement of Attitudes

##### I. ATTITUDES CAN BE MEASURED<sup>5</sup>

*L. L. Thurstone*

*The possibility of measuring attitude.*—The purpose of this paper is to discuss the problem of measuring attitudes and opinions and to offer a solution for it. The very fact that one offers a solution to a problem so complex as that of measuring differences of opinion or attitude on disputed social issues makes it evident from the start that the solution is more or less restricted in nature and that it applies only under certain assumptions that will, however, be described. In devising a method of measuring attitude I have tried to get along with the fewest possible restrictions because sometimes one is tempted to disregard so many factors that the original problem disappears. I trust that I shall not be accused of throwing out the baby with its bath.

In promising to measure attitudes I shall make several common-sense assumptions that will be stated here at the outset so that subsequent discussion

<sup>5</sup> From L. L. Thurstone, "Attitudes Can Be Measured." *American Journal of Sociology*, 33, 1927-1928, pp. 530-531. This is one of a series of papers by the staff of the Behavior Research Fund, Illinois Institute for Juvenile Research, Chicago. Series B, No. 110.

may not be fogged by confusion regarding them. If the reader is unwilling to grant these assumptions, then I shall have nothing to offer him. If they are granted, we can proceed with some measuring methods that ought to yield interesting results.

It is necessary to state at the very outset just what we shall here mean by the terms "attitude" and "opinion." This is all the more necessary because the natural first impression about these two concepts is that they are not amenable to measurement in any real sense. It will be conceded at the outset that an attitude is a complex affair which cannot be wholly described by any single numerical index. For the problem of measurement this statement is analogous to the observation that an ordinary table is a complex affair which cannot be wholly described by any single numerical index. So is a man such a complexity which cannot be wholly represented by a single index. Nevertheless we do not hesitate to say that we measure the table. The context usually implies what it is about the table that we propose to measure. We say without hesitation that we measure a man when we take some anthropometric measurements of him. The context may well imply without explicit declaration what aspect of the man we are measuring, his cephalic index, his height or weight or what not. Just in the same sense we shall say here that we are measuring attitudes. We shall state or imply by the context the aspect of people's attitudes that we are measuring. The point is that it is just as legitimate to say that we are measuring attitudes as it is to say that we are measuring tables or men.

The concept "attitude" will be used here to denote the sum total of a man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions about any specified topic. Thus a man's attitude about pacifism means here all that he feels and thinks about peace and war. It is admittedly a subjective and personal affair.

The concept "opinion" will here mean a verbal expression of attitude. If a man says that we made a mistake in entering the war against Germany, that statement will here be spoken of as an opinion. The term "opinion" will be restricted to verbal expression but it is an expression of what? It expresses an attitude, supposedly. There should be no difficulty in understanding this use of the two terms. The verbal expression is the *opinion*. Our interpretation of the expressed opinion is that the man's *attitude* is pro-German. An opinion symbolizes an attitude.

Our next point concerns what it is that we want to measure. When a man says that we made a mistake in entering the war with Germany, the thing that interests us is not really the string of words as such or even the immediate meaning of the sentence merely as it stands, but rather the attitude of the speaker, the thoughts and feelings of the man about the United States, and the war, and Germany. It is the attitude that really interests us. . . .

The following extract from a study by Zimmerman is significant in that it shows the validity of a "paper-and-pencil" measurement of attitude in terms of significant behavior—activity in a co-operative enterprise.

2. TYPES OF FARMERS' ATTITUDES<sup>6</sup>

Carle C. Zimmerman

Co-operative attitudes furnish the material for an analysis of this first class which may be called *overt* attitudes. The farmers included in this study varied

TABLE XIII

RELATIONSHIP BETWEEN CO-OPERATIVE EXPERIENCE AND ATTITUDES FAVORABLE TO CO-OPERATION

<i>Amount of Experience in Years</i>	<i>Number in the Group</i>	<i>Per Cent Favor Co-operative Selling</i>
None	32	16
1-5	96	73
6-10	67	82
11-15	54	91
16-20	19	95
21-25	19	95
26-30	18	100
31-35	13	100
More than 35	27	100
Total	345	79

in their experience with co-operative marketing and attitudes favorable to it according to Table XIII. A first glance at this table shows a decided relationship between experience and attitudes. The Pearsonian coefficient of gross

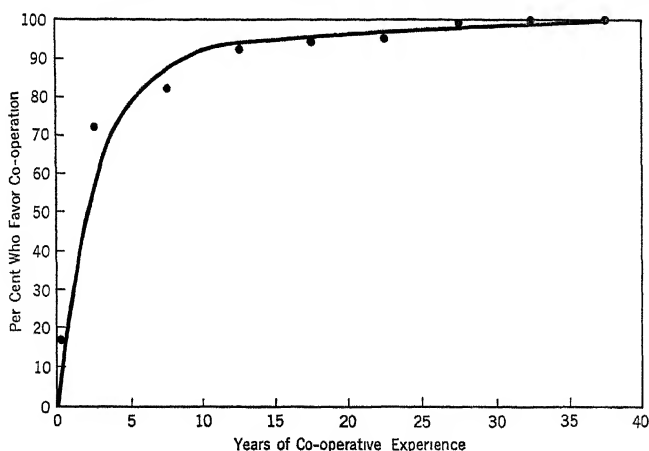


FIG. 15.—A smoothed curve showing the curvilinear relationship between co-operative experience and attitudes. The dots are the actual percentages for the groups studied.

correlation between the two variables is  $+0.66 \pm 3. \text{S.E. } 0.09$ . However, this mathematical expression provides for a linear relationship, whereas the actual correlation appears to be curvilinear. Figure 15 is a smoothed curve expressing

<sup>6</sup> From Carle C. Zimmerman, "Types of Farmers' Attitudes." *Social Forces*, 5, 1926-1927, pp. 592-593.

the actual relationship. The correlation between the readings from the smoothed curve and the actual readings is  $+0.99 \pm 3 \text{ S.E. } 0.0016$  or almost perfect.\* The conclusion is that, in the long run, objects of overt experience determine their own attitudes, and for practical purposes of statistical analysis, such experience may be used in lieu of attitudes.

## V. The Psychological Nature of Interests<sup>7</sup>

*Douglas Fryer*

With the advent of measurement human interests have lost some of the mystery with which education and industry, abetted by a philosophical psychology, had surrounded them. A definition of interests some twenty-five years ago left the average man, who was familiar with the expressions of interest, quite bewildered. Today interests are more clearly defined by their measurement. They are named from the objects and activities, the psychological stimuli, which engage the attention of the individual.†

Psychology has used this concept in the measurement of interests, whether their investigation is by means of subjective methods or objective methods. But the method of study determines their designation as subjective or objective interests. Introspective psychology has extensively investigated the nature of subjective interests. . . .

Subjective interests are of two kinds, which are determined by the two feelings of pleasantness and unpleasantness that accompany the interest experiences. In a measurement sense, subjective interests are likes, which are estimated experiences characterized by feelings of pleasantness, and aversions are dislikes, which are estimated experiences characterized by feelings of unpleasantness. Indifferent experiences mark off these two feeling experiences which are present in varying degrees under stimulation from the objects and activities of the environment.

Objective interests are reactions. If one gazes intently at automobiles in

\* These are correlations of group percentages and are considerably higher than correlations of individuals. Hence, they must be taken tentatively.

<sup>7</sup> From Douglas Fryer, *Measurement of Interests*. New York: Henry Holt and Company, 1931, pp. 15-17.

† For this designation of interests as stimulating objects and activities in the individual's environment there is precedent from the measurement of abilities. The measurement of abilities consists in the measurement of ability expressions. The abilities receive their name, as do the interests, from the stimulating objects and activities. Interests are the objects and activities that stimulate pleasant feeling in the individual. Aversions are those which stimulate in him unpleasant feeling. Interests and aversions, then, are material quantities. These objects toward which the individual reacts are: property, people, stocks and bonds, capital in the form of principal and interest—all such material quantities considered by the science of economics. In addition to these material quantities, there is the capacity for consumption and for purchase. Other things not usually recognized as interest objects are ideas, copyrighted or patented or secretly treasured from the world. The objects of interest for the draftsman are not only his drawing board and his tools, but also his technique; for the teacher, not only his books, his pupils, and his experimental apparatus, but also his pedagogy and his prestige. These are also the objects of ability expression, and these objects are spoken of as abilities. But the manipulation of them is with pleasant feeling, unpleasant feeling, or no feeling whatsoever. In this sense, they are interests and aversions when they stimulate feeling experience.

a showroom, or parked along the street, we have an interest expression which is objectively observable. On the other hand, to estimate that one likes automobiles is a subjective interest. As with subjective interests, there are two kinds of objective interests, which are determined by the two movements toward and away from the stimulus. In a measurement sense objective interests are positive reactions and objective aversions are negative reactions to stimulating objects and activities in the environment. Indifferent reactions are evident in the absence of motor attention. There are varying intensities of objective interests as with subjective interests.

Both subjective and objective interests may be viewed as acceptance-rejection activity. An acceptance-rejection theory of interests is discussed in a later chapter as the most acceptable definition of the interest activities. These acceptances and rejections are observed in the behavior of the individual and in his estimates of pleasure and displeasure when stimulated by an interest situation.\*

*Some results of measurement.*—Measurement has done more than clear up the theoretical concept of the nature of interests. The measurement of interests fills an important place in individual psychology as it is applied, particularly in education and industry.

The measurement of interests is not more than ten years old (1920). But before that time the child study movement had been founded upon interest concepts. An upheaval in scientific management was caused by recognition of the importance of this factor in the management of men. Guidance used interests as its starting point and education based its instruction upon the development of interests.

More definite results, however, have been achieved through the measurement of interests. Early conceptions accepted interests as having a high degree of permanence, so great that future interests were thought to be predictable from present ones. This statement of the development of interests has suffered from overemphasis. There exists a considerable oscillation of interests in mental life. Development is not always in relation to the same objects and activities of one's environment. The change factor is as important as the permanence factor in the development of interests. In so far as specific future interests are concerned, prediction over a period of longer than a year is without warrant. Old theories are replaced by new ones. The important thing is that this change allows for a well-rounded development of an interesting life.

\*The use of terms in the field of interest is very confusing. Measurement is giving us the definitions which we must follow. In the same way, the measurement of abilities has defined the terms in that field. In scientific usage the plural nouns are preferred. We speak of interests and aversions, which are the objects and activities of stimulation. There are few unitary stimuli which can be spoken of in the singular as an interest or as an aversion. Sometimes an occupation or a social event is spoken of in the singular as an interest. But generally the plural noun is used. Any stimulating situation is made up of numerous specific interests or aversions. Usage has established a new adjective, referring to an interest or interests, and spelled the same as the singular noun. The phrases "interest experience," "interest inventory," "interest interview," "interest history," and so on, are frequently seen. Aversion is sometimes used in this manner as an adjective. This terminology is followed throughout the book.



Another early conception related interests to abilities or efficiency and looked for a prediction of abilities or achievement by an analysis of the individual's interests. For a time the best clinical practice aimed to secure a true statement of interests as the best guide for an adjusted personality. It seemed that interests must be a factor in efficiency and success, and a great deal of research has been devoted to this problem which does not as yet appear to be solved. Interests are and must be separate from abilities in the measurement sense, if they are not the same psychologically. Results of research show them to be fairly unrelated, even more so than measures in two fields of abilities such as the abstract and mechanical. But the problem of the influence of interests upon success, over a long period of time in particular, still awaits solution. High morale in a field of activity necessitates interests in this field. Perhaps more important in morale is motivation, the driving factor of the interest stimulus. But the individual satisfaction of interests would seem also to be important in achievement and success. Research does not find it so over a short period of time. We must await evidence of its effect over a long period of time.

## VI. Interest and Ability in Educational Guidance <sup>8</sup>

*Douglas Fryer*

This investigation is a study of the relationship between interest and ability in educational subjects. Ability is measured in two ways, first as estimated by the student and second as based upon school grades. As an allied problem the relation of the student's estimates of ability to school grades has been measured. . . .

It would appear from all available data that the relationship between educational interests and abilities as expressed in school grades is represented by average correlations between  $+ .20$  and  $+ .40$ . Taking the high school expressions for the New York University students as possibly offering the most exact data available, the median correlation is  $+ .39$ . The median correlations available for this relation, including that of Bridges and Dollinger (Thorndike's evaluation) run as follows:  $+ .04$ ,  $+ .12$ ,  $+ .12$ ,  $+ .28$ ,  $+ .39$ ,  $+ .46$ ,  $+ .57$ , for which  $+ .28$  is the median. We might then take  $+ .30$  as representing the average relationship between educational interests and abilities according to school grades. Whatever mathematical representation is taken for this relationship, it is not high.

Thorndike has argued that the relation between estimated ability and interest is nearer the truth than the relationship between ability, as measured by school grades, and interest. For ordinary high school and college grades the writer would maintain the opposite view. School grades are the more generally accepted educational criterion. They are objective, and objective criteria are found to be more accurate as a rule. Considering the possibility

<sup>8</sup> From Douglas Fryer, "Interest and Ability in Educational Guidance." *Journal of Educational Research*, 16, No. 1, 1927, pp. 27, 36-37.

of both being partially correct, the correlation between interest and ability would seem to reside somewhere between the two, about  $+.45$ . The correlations between *vocational* interests and abilities are somewhat lower than this, although one would expect theoretically the relationship to be about the same in these two fields of expression. The correlations between vocational interests and abilities run from about  $+.10$  to  $+.50$ , which is almost exactly the relationship found between educational interests and educational abilities according to school grades.

The following gives the method used and the conclusions drawn from a psychological study of biographical and other material relating to historically eminent persons.

## VII. Interests <sup>9</sup>

Catherine M. Cox

The following types of interest were rated:

(1) *Intellectual interest*—evidence of an urge toward mental activity in the direction of generalization and the derivation of universal laws.

(2) *Social interest*—evidence of an urge to participate in activities with other human beings.

(3) *Activity interest*—evidence of an urge to do, to act, to create, to make changes in the existing order.

(4 to 7) *Breadth of distinct and of related interests* and their *intensity* were also rated.

A seven-point scale  $+3$  to  $-3$  with a 0 average \* was used: 0 = average;  $+1$  = slightly above average;  $+2$  = considerably above average;  $+3$  = the highest degree of interest.

An index of the interests rated with the average group scores is presented in Table XIV. Statistical treatment of the ratings yielded the following conclusions:

(1) No individual rating on *intellectual interest* is below  $+1$ ; i.e., more than average interest in mental activities is evident in each case. (2) In *social* and *activity interests* the group rates considerably above the average. (3) *Breadth of distinct interests* is slightly above the average; *breadth of related interests* is considerably above the average. (4) *Intensity of two or more interests* is slightly above the average; *intensity of a single interest* approaches the upper limit. (5) *Intellectual interest* and *breadth of distinct and of related interests* correlate positively with intelligence. (6) *Social* and *activity interests* show a slight negative correlation with intelligence, but none of the ratings fall significantly below average. This may be an indication that factors other than the intellectual make for eminence, and that a greater *social* or *activity interest* may offset, in the achievement of eminence, a lesser interest in *intellectual* matters.

<sup>9</sup> From Catherine M. Cox, *Genetic Studies of Genius*. Vol. II, *The Early Mental Traits of Three Hundred Geniuses*. Palo Alto: Stanford University Press, 1926, pp. 167-169.

\* The 0 average is the average for unselected youths and not the average of this group.

The following, which summarizes the results of part of a careful and extensive study of several hundred superior children in California, has important implications particularly with reference to the wants, interests, and attitudes of gifted children. Then "All I. Q." in Table XIV is a classificatory symbol employed in the study.

TABLE XIV

INDEX OF INTEREST—KIND, BREADTH, AND INTENSITY—FOR EACH OF FIVE All I.Q. GROUPS

All I.Q.	100 to 115 (Number of Cases 2)		120 to 135 (Number of Cases 17)		140 to 155 (Number of Cases 49)		160 to 175 (Number of Cases 27)		180 to 200 (Number of Cases 5)	
	Index of Interest	Number Reported	Index of Interest	Number Reported	Index of Interest	Number Reported	Index of Interest	Number Reported	Index of Interest	Number Reported
(1) Intellectual . . .	1.0	(1)	2.0	(12)	2.5	(49)	3.0	(27)	3.0	(5)
(2) Social . . . . .	2.0	(1)	2.5	(14)	2.0	(47)	1.7	(26)	1.4	(5)
(3) Activity . . . . .	2.0	(1)	2.4	(16)	2.4	(47)	1.8	(27)	1.6	(5)
(4) Breadth of distinct interests	—	(0)	.4	(11)	1.4	(47)	1.6	(27)	1.6	(5)
(5) Breadth of related interests	2.0	(1)	1.0	(11)	2.0	(41)	2.3	(26)	2.4	(5)
(6) Intensity of a single interest	3.0	(1)	2.2	(14)	2.4	(48)	2.8	(27)	3.0	(5)
(7) Intensity of two or more interests	0	(1)	.2	(11)	.9	(40)	1.2	(25)	1.0	(4)

### VIII. Summary <sup>10</sup>

*Barbara S. Burks, Dortha W. Jensen, and L. M. Terman*

(1) Answers given by the gifted subjects when questioned as to which school studies are liked most and least show in the case of boys a relatively strong liking for the sciences and a marked distaste for ancient languages; for the girls, a relatively strong liking for art, English, and modern languages, and a distaste for mathematics and civics.

(2) With respect to time spent in general reading, the girls slightly exceed the boys. Their average number of hours weekly is 7.6, as contrasted with 7.2 for the boys.

(3) Up to and including age fourteen, the gifted boys spend more time upon general reading than upon home study, but after age fourteen they spend more time on home study. The hours of home study of the gifted girls overtake their hours of general reading at age thirteen.

(4) The gifted boys are more interested in fiction, history, biography, travel, science, poetry, and drama, and less interested in adventure, detective stories, and nature or animal stories than they were at the time of the original study. The girls are more interested than formerly in poetry, drama, history,

<sup>10</sup> From Barbara S. Burks, Dortha W. Jensen, and L. M. Terman, *Genetic Studies of Genius*. Vol. III, *The Promise of Youth*. Palo Alto: Stanford University Press, 1930, pp. 131-132.

biography, and travel, and less interested in adventure, mystery tales, legends, and nature or animal stories.

(5) The girls continue to show a greater interest than the boys in fiction, and more than twice as many girls as boys have developed an interest in poetry and drama. The boys continue to show a greater interest than the girls in adventure and detective stories. There is no marked sex difference in the number enjoying history, biography, and travel.

(6) Both gifted boys and gifted girls tend to prefer reading to all other occupations; both sexes prefer "games that require lots of exercise" to "games that require little exercise." The attitude of the boys toward study tends to be one of indifference. Both sexes dislike "sewing, cooking, knitting, housework, etc." The boys neither like nor dislike "spending time alone," but the girls tend to like it fairly well. Both sexes enjoy spending time with either one other person or several other persons, and like fairly well to be leaders and to manage other persons.

(7) More than half of the gifted boys and girls prefer to read when they have an "hour or two to spend just as they please." Athletic games and exercise come second on the lists of preference.

(8) Gifted boys and girls show a decline in collecting interests after age fourteen. The boys rather outnumber the girls with respect to number of collections made, and very greatly outnumber the girls with respect to number of collections having scientific interest.

(9) One or more offices or honors are recorded upon the Interest Blanks of 87 per cent of the boys and 96 per cent of the girls from whom blanks were received. The gifted subjects take part in a wide variety of extracurricular activities, and are as likely to gain recognition in any one of several kinds of nonacademic activity as they are in scholarship.

The next two selections are of interest especially in connection with the often stated educational objective of the worthy use of leisure time and, in general, with the broader cultural, appreciational aspects of education.

## IX. Summary of the Significant Findings, Conclusions, and Inferential Recommendations <sup>11</sup>

### 1. THE TESTS OF RECOGNITION OF MERIT

*Robert K. Speer*

*An index of appreciation.*—The tests of Recognition of Merit in Poetry, Recognition of Merit in Prose, General Art Judgment, Esthetic Sensitivity, Sensitivity to Merit in the Pictorial Arts, Sensitivity to Merit in the Fine Arts are all deemed to be measures of worthy capacities or school achievements. These tests have in this study proved to be as reliable as the commonly used,

<sup>11</sup> From Robert K. Speer, "Measurement of Appreciation in Poetry, Prose, and Art, and Studies in Appreciation." New York: Columbia University Press, Teachers College, Contributions to Education, No. 362, 1929, pp. 69-71. Bureau of Publications.

commercially distributed, group achievement tests. They may be definitely strengthened by selection and extension of their items.

Occasional use of tests of these capacities and achievements would have a salutary psychological effect on teachers. The present practice of testing in reading, writing, arithmetic, spelling, and composition has, it is believed, in many cases caused teachers to be more concerned with these subjects. The application of these tests of appreciative functions would help to regain a balance in instructional emphasis and assist in lessening undue concentration on the formal subjects in which tests are now largely applied.

If inventory tests in the traditional school subjects have a value, it may be conceded that it is also desirable that we be able to determine the status and comparative standing of individuals and groups in their appreciation of poetry, literature, art, and the like. These tests of appreciative functions will be valuable to this end. A number of tests used in these studies, new to the field of educational measurement, will assist teachers in determining the present status of groups, and will be better than teachers' judgments alone in determining the status of individuals.

It is true that adults determined the merit weighting of each specimen of poetry. In this respect the scale and the test of Recognition of Merit in Poetry are adult standards. If a defense for this is necessary we have not far to go to find a precedent. All the composition scales used in measuring in the schools are adult standards. To the extent to which adult judgments are not acceptable for school standards, the composition scales, the drawing scales, etc., may be criticized. To that same extent the tests of Recognition of Merit in Poetry and in Prose and Art used in this study may also be criticized.

The educational specialist, in each of the arts, treats his subject as developmental, both in skill and in appreciation. The question is not whether Edgar Guest is as good a poet as Shelley. The fact is the teacher does not treat him as such. Shelley is an adult standard. So are Mona Lisa, Venus de Milo, "Snowbound" and the Liszt Rhapsodies. They are teacher standards and as such regulate teacher objectives and determine the curriculum content, method, etc., in poetry, literature, art, and music. Even those who oppose the setting up of adult standards may find some merit in these tests, for the knowledge of the status of an individual on a scale of recognition of merit will be valuable information [as to] whether the pupil is to be guided in his growth to the left or [to] the right of the scale. To those who are so minded, and who at the same time are concerned with development, the scale and the tests may be thought of as having "map" directions and the concepts of high or low, up or down, would then be ignored.

The problem of how to teach appreciation of poetry, art, etc., is treated in scores of books and periodicals. The evidence is most often based upon philosophical and psychological considerations or upon the subjective testimony of those of experience. Such methods of evaluating practice are not to be ignored. To the scientific investigator, however, the best methods of teaching appreciation remain a guess until tested in controlled situations. Controlled

experimentation in these fields demands tests for accurately measuring growth in appreciation. The tests of Recognition of Merit in Prose and Recognition of Merit in Poetry, devised as a part of this study, have proved to be sufficiently reliable for use in experimental and controlled studies of method. The tests of General Art Judgment and of Esthetic Sensitivity have been shown in this study to be appropriate for the same experimental purpose in the upper elementary grades.

The Recognition of Merit tests constructed and the others used in these studies are "general merit" yardsticks. There are those who would have made tests of judgment of the merit of balance, symmetry, color, form, etc. With reliable "general merit" tests, the special characteristics of form, structure, rhythm, imagination, balance, proportion, color, etc., may now be studied as problems of learning. Each of the specific factors may be studied in terms of the emphasis in teaching and consequent growth. Teachers may be assigned to concentrate on the specific factors separately and in various combinations, and studies may now be made of the resultant growth as measured by these newly constructed "general merit" tests. The construction of these tests makes possible the scientific execution of an experimental program of studies into the effects and contributions of the specific characteristics or factors.

## 2. PRACTICAL BEARING OF FINDINGS<sup>12</sup>

*Joseph Schachtman*

. . . . we find that the scores made both by the pupils in the original Abbott-Trabue study and by the pupils tested in the present study show that these high school pupils have very little ability to judge poetry. In both investigations the mean score was less than five out of a possible thirteen. It is probable that by teaching the pupils definitely what elements constitute good poetry rather than by telling them which poems are good, the schools might be able to develop their power of judging poetry to a higher degree than they now possess. Contrary to one popular theory, it seems that little will be accomplished in developing this power by emphasizing some other element of English. The relationship of the judgment of poetry to comprehension in reading, to formal grammar, and to correct usage is insignificant. Probably the only way to develop the power to judge poetry is to teach poetry with that end in view.

## X. Generalized Behavior and Ideals<sup>13</sup>

*Vernon Jones*

Mention has just been made of generalized responses, and the question immediately arises as to how such generalizations are built up and how they

<sup>12</sup> From Joseph Schachtman, "Elements of English Related to the Judgment of Poetry in Grade Eleven." New York: Columbia University Press, Teachers College, Contributions to Education, No. 373, 1929, p. 46. Bureau of Publications.

<sup>13</sup> From Vernon Jones, "Children's Morals." Chapter XIII in Carl Murchison (Ed.), *Handbook of Child Psychology*. Worcester: Clark University Press, 1931, pp. 472-473.

function in influencing moral behavior. There is a continuity running through all learning, from that of a child's making the simplest stimulus-response connections to that of forming his most complex ideas of right and wrong upon which his ideals depend. The continuity can at least be hinted at by the following bare outline. When a child makes a response which is judged to be undesirable or wrong in a situation, there come along simultaneously from the parent disapproving gestures, facial expressions, vocal tones, or such words as "don't," "no-no," "that's bad," "that's wrong," and the like. The responses of the adult stimulate the child, and the normal response to such stimuli are to "stop present activity," "attend to," "shrink from," "avoid," etc. By repeatedly experiencing annoyance in connection with the response, the child is conditioned against it. If the child in the same situation switches over to a response which is judged to be the proper one, his action is rewarded by a smiling countenance, approving gestures, and such words as "that's nice," "that's right," and the like. He has similar experiences on every side and, just as he learns gradually the uses of objects, he learns that certain acts are looked upon with approval and others with disapproval. Time goes on, and the child finds that there are approved-of or not-approved-of aspects in a large number of situations; he learns that such words as "right," "wrong," "ought," "mustn't," "good," "bad," refer to certain common factors in many situations. No other behavior of his is so violently responded to by adults as this where questions of right and wrong are raised, and consequently no other becomes so quickly and so thoroughly emotionally toned. With the increasing ability of the child to use verbalized concepts goes increasing use of and understanding of the generalizations of right and wrong, good and bad. His first generalizations of wrong are based on a few acts which he has learned are not approved of and which he pronounces in a parrotlike fashion to be bad. But as time goes on he experiences what is called right and wrong in a great variety of situations, and his generalizations are progressively reconstructed. Attending the development of generalized ideas of honesty and dishonesty, of rightness and wrongness, there is the integration of innate tendencies and the development of emotional accompaniments. Here we have the genesis of ideals.

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### EXERCISES

1. From a textbook in principles of education obtain the stated aims or objectives of education and evaluate the extent to which they involve attitudes.
2. Explain in psychological terms the origins of the "still, small voice" of conscience.
3. Boys frequently use less correct English than girls. Show how this may be related to group attitudes toward "sissies."
4. High school boys on the average achieve better in mathematics than girls. Is this an inborn sex difference? How might one explain the fact in terms of differential interests and attitudes?
5. In a study of attitudes of grade school children in certain schools towards legal decisions involving juvenile delinquents the average attitude scores were found significantly related to the fact that one of the schools had a pupil self-



government organization. What are the implications of this for citizenship training?

6. The attitudes of rural high school pupils in Indiana toward Negroes was measured and found to be decidedly antagonistic. These pupils have had little or no direct experience with Negroes. How do you account for the observed hostile attitudes?

7. Can a general principle of the genesis of race attitudes be formulated to cover the facts given in Question 6?

8. Find instances to support Hume's statement that "when reason is against a man he will soon turn against reason."

9. Popular books and magazine articles frequently state or imply that the attitudes of youth and old age are, generally speaking, in conflict. Studies of parents' and children's attitudes toward a variety of attitude objects showed rather substantial positive correlations. Can the popular notion and the scientific facts be reconciled?

10. What, psychologically, is morality?

11. Surveys of high school pupils' vocational choices uniformly show more than half of them to be in the learned professions. Only about 5 per cent of the pupils can enter these professions. What are the educational and psychological implications of this situation?

12. In 1935 it was estimated that 6,000,000 youths in the United States between the ages of sixteen and twenty-four were neither employed nor in school. Outline the psychological problem of morale involved in terms of wants, interests, attitudes, ideals, and character.

13. Substantial shifts of attitudes have been experimentally demonstrated to be readily achieved in grade and high school pupils through rather brief instructional content. What are the psychological and educational implications of this?

14. It has been claimed that appeals to the emotions are more effective in producing action than appeals to reason. Outline a specific experiment to test this hypothesis.

15. "You can't change human nature" is a statement frequently made. Criticise, attack, or defend the statement.

## CHAPTER XI<sup>1</sup>

### CHARACTER FORMATION AND SOCIAL FUNCTIONING

*Francis F. Powers, University of Washington*

#### I. Introduction

With the reinterpretation of educational values during recent years, character education has come in for an increasing amount of attention. This has been a natural result of the American ideal of universal education. When the school population was still small enough to be governed by corrective discipline, tradition and the economic system re-enforced the authoritarian regulation of human conduct. Population growth and concentration, the almost unwieldy increase in school enrollment and the disappearance of frontier life, together with the thousands of factors that have entered into modern life forced the character education movement to a new self-consciousness. It was seen to be endowed with a utilitarian value for society and sought less as an end in itself and more as a means to better social functioning. To many educators of the present day, repression and corrective discipline are no longer the best guarantee of favorable social conduct, and the trend in character education has been toward the development of individual responsibility. This change in trend has been determined by introspective techniques more than statistical and, on the surface, appears to some a dubious shift, for in spite of the phenomenal growth of the new methods in character education, our prisons and corrective institutions are full and growing out of proportion to the general population increase. More serious still, statisticians tell us that the majority of social offenders are in the age group comprising the late teens and early twenties, an age group that has been exposed to the new methods of character training. The cause-and-effect relationship here can be interpreted and qualified variously and, while a goodly number of educational philosophers favor formal discipline as a means of conduct control, an equally serious group believes in preventive character guidance. As is indicated by the following fairly representative series of excerpts from recent writings on the subject, the latter point of view is in the greater favor at the present time.

#### II. Psychological Nature of Character

Almost anyone can, after a little thought, make a definition of character satisfactory to himself, but many of these definitions would be at variance. Fortunately, practical work on the improvement of character does not depend upon the posses-

<sup>1</sup> The selections in this chapter supplement the discussions found in many of our textbooks, including the following: Skinner and Collaborators, *Educational Psychology*, Chapter IX by Dr. F. F. Powers; Griffith, *An Introduction to Educational Psychology*, Chapters VIII and XVII; Trow, *Educational Psychology*, Chapter X; Jordan, *Educational Psychology*, Chapters XV, XVI, and XVII; Powers and Uhl, *Psychological Principles of Education*, Chapter V; Gray, *Psychological Foundations of Education*, Chapter V; Benson, *et al.*, *Psychology for Teachers*, Chapters XVIII and XIX; Hines, *Educational Psychology*, Chapter XI; and Pintner, *Educational Psychology*, Chapter IV.

sion of a single theoretical definition satisfactory to everyone. A common element in many definitions is the statement in terms of conduct, that being our only objective evidence for judging another's character outside of possible clues discoverable by means of phrenology, physiognomy, and the like. It may be said, therefore, that any rational definition of character may be a starting point upon which to build a program of character education.

## 1. EVALUATION OF DEFINITIONS<sup>2</sup>

*Percival M. Symonds*

This conglomeration of definitions represents many different emphases and points of view. Some are definitely opposed to others, and yet there are certain relationships that run through all. These definitions may be summarized as follows:

(1) Character has to do with those phases of man's behavior other than the intellectual.

(2) Character is observed in the crystallization of definite traits.

(3) Character represents an organization of behavior.

(4) Character is related to conduct. Some claim that character is a summation of conduct—others claim that conduct issues from character.

(5) Character in a limited (and usual) sense refers to moral character, that is, one's behavior relative to the conventions and standards of society.

(6) Character is the result of an evaluation.

(7) Character has to do with the outward expression of inner attitudes or dispositions. Gates says that this expression is focused on the face and may be read there by those with trained perception.

(8) Character in a limited sense refers to socialization, self-seeking, and social participation.

## 2. CHARACTER AS CONDUCT<sup>3</sup>

*Rudolf Allers*

In order to appreciate the character of a man, it is necessary first of all to concentrate on what he *does*. Admittedly, we all more or less assume that the words in which he expresses his views, aims, and sentiments will conform with his actions. But experience teaches us that many men consciously—and probably, as we shall see later, a much larger number unconsciously—fail to act up to their declared principles. That fair words can cover an ugly disposition is a common enough experience. The ugly disposition will eventually express itself in deeds. Hence one has always stressed the deeds of a man as an index of his disposition, his real thoughts—in fact what is ordinarily called his “character.” But the concept of an act or deed must not be unduly restricted; it must be made to include not only deeds in the special sense of the

<sup>2</sup> From Percival M. Symonds, *The Nature of Conduct*, 1928, p. 285. By permission of The Macmillan Company.

<sup>3</sup> From Rudolf Allers, *The Psychology of Character* (Translated with an Introduction by E. B. Strauss), New York: Sheed and Ward, Inc., 1931, pp. 7-8.

term, but also movements, gestures, expressions, looks, postures and lineaments, his behavior in various situations. In short, all the factors that go to make up the general term "conduct" form the basis of the estimation of character.

### 3. THE PSYCHOLOGICAL NATURE OF CHARACTER <sup>4</sup>

*Frank N. Freeman*

What is character, to what extent may it be influenced, how may it be influenced? Advocates of methods of character training often pass over the first two questions without so much as a passing glance, and treat the third dogmatically and with no attempt to give satisfactory evidence of the value of their methods. Psychologists and educators are now quite confident that many of the methods used in the past defeated their own ends. An example is given by Hartshorne and May of a group of children belonging to an organization which attempted to improve them by encouraging them to report their own good deeds. Whatever else this method accomplished it was apparently very effective in making the children dishonest. At this time when so many are seeking a panacea for misconduct it is worth while to pause while we make an analysis of fundamental principles.

In our thinking about the practical problems of the development of character, we are apt to draw a sharp line between those attitudes or those acts which fall within the realm of good or bad conduct and those which are neutral in respect to conduct. Those attitudes or acts which may be called good or bad are evidences of character and those which may not be called good or bad have nothing to do with character. This is the point of view which is often taken by the educator or the person interested primarily in the prevention of crime or other misconduct. The scientific student of human behavior, however, is likely to find difficulties with this sharp distinction. In fact, he may arrive at a point in his attempt to explain behavior when distinctions between conduct which is judged to be good or bad, and behavior which is ethically neutral disappears. The problem of character development, from this point of view, is concerned not merely with the acquisition of a certain limited set of ideas and habits, but is broadened to include the control of all those conditions which influence the individual's behavior. Character education, under this conception, becomes synonymous with the whole of education in all its parts and aspects.

The point of view of the psychologist is shown in the way he goes about the study and treatment of delinquents, particularly juvenile delinquents. In such cases the individual has done something which brings him into conflict with society in general or with the portion of society which constitutes his immediate environment. The psychologist does not begin, as the moralist or the jurist might do, by analyzing and classifying the person's act, trying to decide what principle of conduct has been violated and what penalty attaches

<sup>4</sup>From F. N. Freeman, "Comments on Character Education From the Psychological Point of View." *Journal of Educational Sociology*, 4, 1930, pp. 193-195.

to the violation. He rather inquires into the individual's physical and mental constitution, into his parentage, environment, and education, both formal and informal, and into his life history. He analyzes the individual instead of his act. When he has completed this analysis he recommends a regimen of education which will remake the individual and will touch all those features of his life which bear upon his conduct.

The psychologist's conception of conduct and of character education is sometimes misunderstood. Because he sees the individual's behavior as all of a piece and regards the separation of acts into two distinct categories, the ethical and the neutral or expedient, as artificial, he is sometimes regarded as a breaker-down of all standards of behavior. Quite the contrary. He does regard it as quite absurd to consider smoking an ethical question and drinking coffee a neutral question, or playing cards an ethical question and playing checkers a neutral question. Such distinctions are based on authority, and not on science. From the scientific point of view, everything that may affect the individual's development and his adjustment to his world is significant. Nothing is neutral.

If we are to adopt the scientific point of view, then, these conclusions seem incontrovertible. Conduct or behavior, and the factors which influence conduct or behavior are all of a piece. We must not break behavior up into two separate realms, calling one moral and the other nonmoral, either in passing judgment on behavior or in planning for education in behavior. All of education has conceivably an influence on conduct and all elements or procedures in education which may influence conduct must be taken into account in a scheme of character education.

Considered in the large, the development of the child has two aspects. The first is the organization of the individual, considered as an individual, the development of systems of activity which work smoothly and effectively, and taken together form a well-integrated or harmonious whole. The individual's impulses and acts should work together without friction or confusion, performing their function like a well-constructed and well-oiled machine. The individual should be active, energetic, and at peace with himself.

But this is only half the story. A machine is intended to do something, not merely to excite admiration by running smoothly. Likewise an individual must accomplish certain tasks, perform certain duties, do some work in the world. In short he must adjust himself to the environment in which he finds himself. He must meet certain demands of his physical world and of his social world. Adaptation is as essential as is development. These two processes, taken together in their proper relation, and in all they imply, give the elements of a complete formula of education. They likewise give the basis of any adequate scheme of character education. They involve character in both its meanings, as it refers to the traits of the individual considered in and for himself, and to the individual's mode of meeting the demands made upon him by society.

4. CHARACTER AND THE GROWTH OF INDIVIDUALISM<sup>5</sup>*Frank N. Freeman*

Individualism takes a number of forms. It is represented in the self-centered attitude of the egoist. It is expressed in the insistence upon rights and the disavowal of duties. It is represented in selfish competition wherever it is found, in private relations, in business, in politics, and in war. It is opposed to the recognition of obligations, to the practice of co-operation, and to the spirit of loyalty to a common cause. All these types of individualism are rampant in our present age. In the words of Josiah Royce: "The people who have more rights than duties have gained a notable and distinguished ethical position in our modern world. The selfish we had always with us. But the divine right to be selfish was never more ingenuously defended and illustrated than today." Modern individualism, in other words, is not put forth merely as a check or balance against the undue exercise of authority. It is preached rather as an ethical doctrine for which it would be worthy for a man to sacrifice, and even to give up his life.

Besides the individualism which expresses itself chiefly in self-gratification stands the more warlike form which is represented in various forms of competition. This individualism is manifested in seeking for power, in greed for gain, in strife in all its forms in business and social life, in strife between groups, such as capital and labor, in the competition between industrial groups, in political turmoil, in national aggrandizement, chauvinism, and war.

These forms of individualism may seem to be validated by their success, and they are sometimes supported by a specious appeal to the biological doctrine of natural selection and the survival of the fittest. In the long run, however, these forms of competition and strife defeat their own ends.

As a matter of fact, social advancement has come, not through the intensification of competition of any sort, but rather through the wider and wider development of social co-operation. Co-operation was first confined to very narrow groups, but with the development of social and political organization, the elaboration of industrial processes, the development of trade, and the recognition of interdependence, have come the spread of co-operation in all its forms. Shortsighted men are continually trying to secure all the gain from co-operative activities for themselves and deny them to those of other groups; but this policy, like all other policies of individualism is suicidal.

5. A STRUCTURAL DEFINITION OF CHARACTER<sup>6</sup>*William H. Kilpatrick*

By character I shall understand the structural basis of conduct, something that is built up more or less and upon which we can more or less rely for the

<sup>5</sup> From Frank N. Freeman, "Character Education from the Point of View of Psychology." *N. E. A. Proceedings of the Seventieth Annual Meeting*, 1932, 70, pp. 549-550.

<sup>6</sup> From William H. Kilpatrick, "Discipline and Character." *Building Character*, Proceedings of the Mid-West Conference on Character Development, February, 1928, University of Chicago Press, pp. 225-227.

conduct that is to follow. As a matter of fact, however, the unit element of character, as we shall later have to discuss, is habit, and this will have to be explained more fully. Before we go into that, though, let us ask what kind of character we wish. The answer to this will differ according to the way we think of social life. There have been systems of social life, old China, for instance, in which the good character was one that conformed exactly to the rules that had been laid down, and those rules were final and right and they were never to be varied from under any conditions. That kind of conformity to rules once for all laid down, that are adequate to cover every aspect of life, that kind of character is not the kind that fits with the changing world in which we live. There has been also demanded character which would be obedient to the authorities, ask no troublesome questions, let the authorities run everything, and do exactly what they were told to do.

Evidently there are some people in this country that believe in this last kind of character, as nearly as I can tell from the way in which they try to run schools and the way in which they run their homes; but I am going to take a different conception of character.

I am going to suppose a democracy in which there is on the one hand the maximum possible self-direction, and on the other hand a maximum respect for the personality of everybody else; self-direction which respects the personality of others. This is the kind of character that I am going to contemplate.

This sort of character, in order to be able to adjust itself to a changing situation, in order to meet the complicated new problems that arise, in order to act intelligently as situations do present themselves—this kind of character must first of all be intelligent; second, it must have the right disposition, the attitudes which the preceding speaker stressed; and third, it must have appropriate conduct responses, the precise habits of executing what has been intelligently and ethically chosen.

There are three elements, then, in character: intelligence, so that choices may be made wisely; the right social disposition, so that choice will be made ethically; and the correlative habits to execute the choices that have been made intelligently and ethically. This is the kind of character that we wish to build because we are living in a growing, in a changing life and changing civilization. Still further, we must not think of a character as made and finished once for all. The world is an infinite world, and we shall never exhaust its possibilities; and finite or no, it is a changing world, so we have to keep growing to keep up with it. \*

### III. The Need for Character Education in a Democracy

The demand made upon the individual by a democratic State is based upon faith in his ability to make wise choices for himself. Although since the birth of nationality, the American people have lived under a political democracy, it is only comparatively recently that we have been released from a kind of autocracy imposed by the frontier and have attained a geographical as well as political democracy. The problem of educating society to individual responsibility for conduct

has in late years, therefore, become acute. That it has not been completely solved is indicated by the following quotations.

# I. AN INTERPRETATION OF PRISON STATISTICS <sup>7</sup>

*Lewis E. Lawes*

Persons between the ages of fifteen to thirty constitute 50 per cent of the population of the United States, yet they contribute 73 per cent of our criminals. The problem is, therefore, with the young. Unless society can show that it has done its full duty toward its youth and adolescents, it cannot be heard to say, "We did not send for them." Its hands are not clean. It is not free from guilt.

America spends large sums on education. But its bill for luxuries is three times as high. It is niggardly in providing for social advancement, which is left almost entirely to charity and private contributors. A well-known educator promised a decade ago that with the opening of every school he would close a jail. His promise has not been fulfilled. He did not appreciate the fallacy of an education that taught the child to read but neglected the opportunity to teach him to work or even to play.

Vocational training and guidance is a proper subject for school administration. Many children are manual-minded and do not respond to book learning. There should be some method of determining inclinations and fitness for definite vocations during childhood, and school careers should be molded accordingly. Among the important prerequisites for the educated man, I regard most important the one "that an educated man must have not only general culture, but also training for a specific occupation." With vocational training, there will be less truancy and less work for the juvenile courts.

Police clamp down the lid and clean out illicit pool rooms where boys in their teens congregate amid companionship and associations that presage ill for their future. But no substitute is provided where these boys may regroup under more favorable auspices. That leisure is an important factor in schooling has been recognized by educators throughout the ages. The ancient Grecian philosopher taught that "preparation for the right use of leisure should be the chief end of education." It is a potent influence in encouraging a clean outlook on life. Boys as well as adults will play in groups. The boy who is a member of a gang cannot be effectively treated, except in relation to the life of the group of which he is a part. Mental snarls can best be avoided and ironed out in informal but healthy social relationships. Educators and social workers know from actual experience that juvenile delinquency gives way before supervised playgrounds and well-organized boys' and kindred organizations. Some of our larger centers of population report that wherever new playgrounds are opened juvenile delinquency in that neighborhood drops perceptibly. And yet, reliable authority has it that three out of every five children in our greatest cities are without adequate opportunity for wholesome play.

<sup>7</sup> From Lewis E. Lawes, *20,000 Years in Sing Sing*. New York: A. L. Burt Company, 1932, pp. 356-359.



Most of our municipal governments are planning to eradicate slums. They are widening narrow streets and demolishing dark and shabby tenements to replace them with homes where the sun and air will safeguard health and insure simple comforts of decent living. Equally important is the adequate provision for extra educational activities for the young. In every city square of congested areas, I should like to see a Boys' and Girls' Club House, publicly subsidized, on a par with any other part of our elaborate system of education. This may be a large undertaking, but it is a worth-while investment. It is an insurance premium against delinquency, the cost of which is almost negligible in comparison with the toll, in life and property, of even ordinary crime rates. Operation of Boys' Clubs is estimated at about fifteen dollars per capita annually, whereas maintenance alone of a prisoner in Sing Sing and all other penal institutions is well beyond four hundred dollars a year.

All this has to do with prevention. There are other factors. There is the church. Does the minister know his congregants? Does he know how they live and how their children are growing up? Does he invite the confidence of the young? Or would he prefer to be the crusader for "all" the people and neglect those who live around the corner from his church and who need the intimate touch and guidance to save not only their souls but their minds and hearts? One of the reasons why men and women do not take their religion more seriously is that the church and the pulpit have gone in for polemics and controversialism rather than as sowers of seed in their local communities. Ninety-nine per cent of our prisoners at Sing Sing are religionists in name only. They have never been actively interested or affiliated with their churches. Who is to blame? We hear, now and then, of church workers convicted of crime, and I wonder how much the emphasis of ritualism over socialization has to do with it?

It has been estimated that 25 per cent of all children in the United States live in broken homes, broken by death, desertion, separation or divorce. But the studies of the various delinquent groups show that from 40 to 70 per cent come from broken homes. An established rule of modern civilization is that the world owes no man a living. But society surely owes every child a home. Our practice of sending children to juvenile institutions where experience guides inexperience in the ways of vice and filth is one of the tragedies of our national life. Of 1393 new admissions to Sing Sing during 1931, 343 are graduates of juvenile homes and reformatories. Compare these figures with the records of 3307 dependent children in New York City, who were given individual treatment, all of whom were under sixteen years of age. They remained in private homes for periods ranging between one and five years between January 1, 1900, and January 1, 1910. Of these only eleven were arrested for serious offenses.

2. CHARACTER TRAINING AS SOCIAL INSURANCE<sup>8</sup>*Harry C. McKown*

Despite many apparently justifiable arguments to the contrary, at no time in the history of the world has character development been considered more essential in the life of the individual or the nation than now. This great present demand for improved training, for ethical living and the general acceptance of the development of character, as the main objective of the educational process, is the result of at least three factors: (1) a new emphasis upon personal freedom, together with a release from the very rigid standards imposed by formerly accepted, but now partially rejected, authority; (2) the necessity for training for living in more highly complex and intricate life situations; and, as a result of these two factors, (3) a general and increasing dissatisfaction with the inadequacy of school training and school objectives.

Even a cursory glance through the preceding pages of this book will doubtless amaze the average reader with the number, complexity, and relationships of the settings in which character of one type or another develops. The ethical life of the individual is involved in every single waking minute; is being influenced by myriads of incidents and events occurring in all parts of the globe; and the individual, in turn, is influencing the character of his fellow men, be they in his own community or nation or in a far country.

Any community represents a battleground in which there is a bitter and continuous conflict between good and bad influences, each fighting with powerful machines. Perhaps not many of the forces of evil are consciously and deliberately attempting to develop bad character, but, whether deliberate or not, their effects on the child are the same. Arrayed against these evil forces are the forces of the school, the church, the home and other organizations and institutions that have, or should have, a vital interest in improving the social and ethical attitudes and conduct of the child. Out of this battle emerges the character, either good or bad, depending upon the original nature of the child and the relative strength and influence of the combatants. Those of us who are interested in the development of good character will always find that we face savage and ferocious enemies who know no rules and recognize no codes of sportsmanship. Hence, we must fight as they fight; there are no regulations in fighting a mad dog. It is a battle to the death with no quarter asked and none given.

There is no magic formula by which we can conjure up good character instantaneously; nor is there any one medicine potent enough to remedy a bad character. The desired objectives will be attained only through a long, slow, and often discouraging campaign. Out of the present scientific study of character and of the ideals, materials, and methods of character education, as well as from similar succeeding studies, there will come increased efficiency in organizing for, and in promoting, this campaign.

<sup>8</sup> From Harry C. McKown, *Character Education*. New York: McGraw-Hill Book Company, Inc., 1935, pp. 456-458.

Precisely just which materials, procedures, and methods are the most effective in developing ethical character has not yet been determined. As a result of the scientific study of these devices, changes will be made in them; doubtless some of our long-clung-to and fettering traditions, customs, and practices will be eliminated, others altered, and more effective new ones added. It is a trite remark, but apparently necessary, judging by the attitudes taken by many individuals, that the development of vigorous, functional, and positive character, rather than the maintenance of established traditions or techniques, must always be recognized as the main end of education. Even after these devices are definitely decided upon and selected, such decisions and selections should be considered only temporary, because of the rapidity with which society's ideals and standards change. Yesterday's materials and techniques will not solve today's problems; nor will today's materials and techniques solve tomorrow's problems. The farsighted character educator will welcome and experiment with any and all devices that show promise and will ignore the remonstrances of his tradition-bound critics.

In this drive for the development of character, the school, because of its strategic position and its unique opportunity—as evidenced by its objectives, high standards, trained personnel, definite organization, and community support—must be the spearhead of the wedge that is to split and scatter the forces opposed to this cause. It cannot, and should not, be expected to assume all responsibility for the development of character, but it can (1) exert a powerful influence on the children; (2) educate parents and citizens to a realization of their responsibilities; (3) make suggestions for the definite capitalization of their opportunities; and (4) lead in effecting the co-ordination of all of the community's forces.

#### IV. Character Education through Religion

The Church is the traditional institution for formal training in character. Although it may appear to be losing its following, who can say in this day, when so much of our communication takes place by indirection, just how far its influence does penetrate? The excerpts given here illustrate a broader conception of the province of religion.

##### RELIGION, A PHILOSOPHY OF LIFE <sup>9</sup>

*Harold Leonard Bowman*

A famous biologist who considered himself an atheist once said, "I see in the universe a trend toward harmony and I believe it is my duty to become a part of that trend." That is really religion of the highest order. It is the recognition of a value-creating and value-maintaining trend in the universe. This means that just as the marine architect launches his vessel, confident that he lives in a dependable universe in which the water will float his ship—

<sup>9</sup> From Harold Leonard Bowman, "Mental Hygiene in Relation to Religion." *Mental Hygiene*, 20, 1936, p. 186. (Published by National Committee for Mental Hygiene, Inc.)

just as the airplane builder, having made his calculations in his wind tunnel and built his plane with care, sends it forth confident that he lives in a kind of world that will, if he obeys its laws, give his plane success—so it is the conviction of the religious personality that man lives in a dependable universe in which he who sets forth in devoted quest of truth and beauty, of goodness and of love, of fine personality, sharing in the quest of the same values for others, is making his adventure in a universe which achieves in his endeavor, a spearhead of progress. He still recognizes the regularity of natural law, inscrutable, often ruthless; he makes no plea for favoritism. But he rises to the daring conviction that through the mechanism of the physical cosmos there is a creative trend, a push upward toward higher values, an *élan vital*; and that confidence imparts to his life a dignity without arrogance, a reverence without timidity, a drive without need for compensation, a meaning without benefit of fantasy. Assuredly a philosophy of life is invaluable in achieving a unified and dynamic personality, and intelligent, liberal religion is a valuable aid in achieving that philosophy.

## V. Responsibility of the School in Character Education

The question of whether the character education of the child is the proper province of the school, the church, or the home is merely an academic one. In practice, this function is necessarily performed by all these institutions and countless minor ones. Certainly the importance of the school cannot be overstated. It ordinarily possesses the child from eight-thirty or nine in the morning until at least three in the afternoon, often with additional time spent on the school premises in extrainstructional activities such as athletics, school plays, musical productions, etc., and the activities of such organizations as Boy Scouts, Campfire Girls, 4-H Clubs and the like when these are sponsored by the school. Should the child be exposed to an unfavorable school morale during this period, it would be likely to have an almost incalculably bad effect on his conduct. Investigations have shown that children tend to cheat less in their work with one teacher than with another [and] that smoking or drinking is much more common in one type of school than in another. The obvious inference here is (1) that the school cannot avoid responsibility for the character development of the child and (2) that it is possible within limitations for a school administration to control institutional morale.

### I. CHARACTER EDUCATION FROM A PRACTICAL APPROACH<sup>10</sup>

*Charlotte A. Hubbard*

To the high school teacher is presented a valuable opportunity for character building. His pupils, ranging in age from twelve to eighteen, are at the period of adolescence when they approach manhood and womanhood, and, in the words of the apostle, "put away childish things." Parallel with physical

<sup>10</sup> From Charlotte A. Hubbard, "Character Building in Our High Schools." *N. E. A. Proceedings of the Seventieth Annual Meeting*, 1932, 70, pp. 316-317.

development occur mental and emotional developments, also varying in degree with the individual. Peculiarly characteristic of this period is the reaching out for ideals, unfortunately not all of them worthy, if judged by adult experience or by their ultimate effect upon the individual. The high school boy or girl is impressionistic; he is a copyist; he dislikes usually to be different from the other fellows; he is often given to strong emotional feelings for another individual, often a person older than himself.

That there is need for character building in our high school is apparent when we consider the trends of modern society. A century ago, it was possible for the farmer to supply the fundamental needs, food, shelter, and clothing for his family without going beyond the bounds of his farm; home life was more closely knit, and home influence guided the children. Today in our urban society, very little of the needs of mankind originates within the home; food and clothing are produced in factories and brought into the home. This in turn provides leisure, with the result that there is a tendency to go outside for amusement; the hold of the home over the child is weakened. As a matter of fact, the teacher often sees more of the child and knows him better than his own father and mother do.

Then, too, there is a growing spirit of ridicule toward worthy ideals, and a setting up of wrong ideals. It is hardly necessary to more than mention the growing tendency toward lawbreaking within our country today; but the result is that too often the high school teacher meets the attitude that it is no great disgrace to break a law; rather on the contrary, for the disgrace lies in getting caught. The gangster who successfully evades prosecution becomes a hero. Another factor which tends to break down morale and erases the finer traits of character is the hurry of the modern age; the child like his father and mother, is in such a hurry to go from one situation to another that he can't stop to be courteous, to be kindly, to be unselfish.

How is the high school teacher to meet this need for character building? There are two major ways; the first is by a program of ethical training or character education; the second is by the utilization of opportunities presented through the regular program of studies. The first means is apt to become too narrow, too stilted; it doesn't reach the high school pupil because it is too obvious. There is nothing that the adolescent hates more than to be preached at. He recognizes it as a necessary evil in church, and hence to be endured; but if carried into the schoolroom, the result is apt to be destructive rather than constructive. It is not that the pupil does not have ideals—he has plenty, but they are precious to him, and he fears lest they be laughed at.

The second method is by utilizing the pupil's reading, his favorite movie actor, his choice of a radio program as a means to direct him toward a selection of that which is worth while. By class discussion, by comparison of one good with another, of one program with a better one, we can arouse interest in looking for the good things. Here again, it cannot be forced; the wise teacher waits for a chance reference which can be turned to account, a reference which originated within the class, and which can be directed toward a

desire of the class to go into the matter further. The commercial subjects offer a valuable field to inculcate ideals of what is ethical in business, of the value of truth and honesty, and dependability. And certainly no more important character traits can be developed than those which originate through the extracurricular activities which actually create a desire on the part of the pupil to be a good sport, to recognize the rights of others, to play fair—all of these being necessary if one is to be prepared to “meet adequately the circumstances of life.”

## 2. CHARACTER TRAINING AND THE SCHOOLS<sup>11</sup>

*Elvin H. Fishback*

Outside of my window I hear “Stuck ’em up.” I look out and see only a group of ten-year-old boys playing bandit. The boys themselves do not realize it, but they have been profoundly influenced by the radical social and industrial changes of the last twenty-five years. These very changes are rapidly making peremptory demands upon the public schools that will eventually change the course of education. What are the schools to do?

Business and professional men and women have modified their demands of the schools. A few years ago they asked for better training in reading, writing, and arithmetic. They are now fairly well satisfied with the results in the fundamental subjects just mentioned, but they have discovered, much to the chagrin of the schools, that young people lack many of the personality traits that are and always will be, important in business and professional life. They ask for more honesty and industry. More courtesy would be very acceptable.

Adults and children alike are changed by the new social and industrial conditions that are upon us. Many adults have lulled themselves into semi-contentment with the feeling that, after all, there are no standards of conduct that are binding. Children are subjected to so many new social experiences that they are likely to emerge with ideals as heterogeneous as their variant experiences.

As one example of such changes, the home, at the present time, is radically different from what it was a generation ago. It has not failed but it has changed. Women have entered the world of work outside of the home. Clubs and social activities for both men and women have grown by leaps and bounds. Divorces have increased at an augmenting rate. An investigation was made in a large high school, enrolling children from twelve to sixteen years of age, to find out how many of them came from broken homes—homes in which either the father or mother, or both, are missing. Two hundred and fifty boys and girls out of one thousand, or one in every four, came from such homes. Many came from homes in which neither father nor mother is present. Evidently, the home will need some assistance in its moral training of children.

The church is deep and far-reaching in its influence upon young people, but it has lost much of its authority and great numbers of people are not

<sup>11</sup> From Elvin H. Fishback, “Character Training and the Schools.” *Junior-Senior High School Clearing House*, 10, 1935, pp. 236-7.

directly influenced by the church. It is interesting to note that in the year 1840, 88 per cent of the population of the United States were church members, while in the year 1913, church membership was but 33.3 per cent. The efforts of the church must be supplemented by an institution that reaches all of the people.

There are three new inventions that have had a profound influence upon the lives of young people. When seven-thirty in the evening arrives, the boy or girl of the present time has three modes of activity that were not available to the youth of twenty-five years ago. They may remain at home and listen to the various programs given over the radio; they may go to the motion-picture theater and take a chance of seeing and hearing something worth while; or they may get into an automobile and be quickly transported beyond their immediate neighborhood. All of the experiences made possible by these three inventions tend to stimulate curiosity and an interest in affairs outside of the local community.

Schools have held an intellectual emphasis in the past. They have thought and taught that character was a by-product that always evolved after certain intellectual acts. By some form of alchemy, so much mathematics, history, grammar, literature, and composition, with a small mixture of art and music, compounded with industry, would bring forth that most desired result—a noble character.

Gradually, a change is coming over the schools and their leaders. Great numbers of children are enrolled in the schools and colleges who formerly withdrew because they could not jump the intellectual hurdles set by the school. Educators are giving up the old scholastic standards in favor of others that call for the socialization of the child. Education is bound to function in such results as attitudes, ideals, traits, and habits. If this is true, then the intellectual phase of school training becomes a means to an end instead of the end itself. Character, considered in its broadest aspects, becomes the real end of school education.

As the school undertakes this new responsibility, there are certain obligations that are imperative. The old formal academic type of school, which was taken from the sparsely settled rural districts of years ago and transported almost bodily to the thickly settled centers of population, must and is giving way to a new type of school. The new school provides for the full participation of children. They no longer sit at desks and move and think only in response to the teacher's questions. They are originators. They are creative. Instead of the pupil-teacher relations that existed in the old type of school, there are plenty of pupil-pupil and teacher-pupil contacts. In the old type of academic school, there were very few opportunities for the use of the traits of character, except at playtime. The truth of it is that the schools in the time of Andrew Jackson, in the rural districts, depended upon the life outside the school to give opportunities for the use of those traits that are concerned with social behavior. Many parents are, secretly, if not openly, placing a high value upon that part of the school training that helps children to understand how to adjust themselves to the persons about them. This accounts for the great increase

in popularity of social activities in college as against the scholastic ideals of a century ago. More emphasis, instead of less, will likely be given to the personality-forming activities of schools and colleges than is given even at the present time. One enthusiastic leader has declared that the public high school of the future will be organized around the student activities of the school.

However potent this social participation may be, there are other valuable things that the school can do for young people. In spite of the claims of the few persons to the contrary, there are some moral solutions that have been evolved through the slow, agonizing process of trial and error. It is unfair to children to permit them to grow into adult life without a knowledge of the partial or complete solutions of moral questions that have been evolved through the ages. In other words, life is too short to expect the human being to learn from actual experience all that the race has learned during the untold ages that have preceded us.

### 3. SCHOOL VS. CRIME<sup>12</sup>

*Austin M. MacCormick*

In the fight on crime, the school is the logical leader because it is in a position to get directly at the roots of crime in juvenile delinquency. One of the most hopeful things about our present attempts to control crime is that we no longer think only of the grown criminal but of the future criminal who is now a child in our public schools. Crime prevention is being discussed from a more practical standpoint than ever before. The school can do effective work in crime prevention by the expansion and improvement of its facilities for spotting and treating problem children. This does not mean only those who are actually juvenile delinquents, but those who have mental and emotional defects which tend to lead them to delinquency.

The school can also prevent crime by full utilization of its physical resources. It is utterly inconsistent that one should walk down a city street and see an unlighted school auditorium or school gymnasium at the very hours when the lights of pool rooms, dance halls, cheap movie houses and undesirable "hangouts" are blazing most brightly. Our school building might well be for thousands of children an evening refuge from the dull and overcrowded homes whose atmosphere drives them into the street.

In more indirect ways, also, the school can work against juvenile delinquency. I am convinced that the usual public school curriculum has little reality or significance for tens of thousands of children, and that from this group the juvenile delinquents tend to come. If these children are to be required by law to remain in school until their middle teens, they should be given a type of education nearer to what they want and need. Grinding them through grade after grade and stuffing them with facts which have little to do with their life interests is a process which creates problem children and problem adults. The present attempts in the New York City School system to individualize instruction and to adjust the teaching process to the varying types of

<sup>12</sup> From Austin M. MacCormick, "School vs. Crime." *High Points*, 18, 1936, pp. 5-7.



children served are of tremendous importance to anyone who is interested in the prevention of juvenile delinquency and crime.

How to vitalize the public school curriculum is not a problem for the penologist but for the educator. As one who is in some degree a mixture of the two, however, I believe that one way to do it is to make vocational education more respectable and dispel as quickly as we can the impression that the child who transfers to the vocational course is a "dumbbell" and a "low-brow." I do not mean that any child should be given a course which is purely vocational in nature. Any well-organized vocational course requires related training which goes over into the usual public school subjects, and these subjects become significant in the light of the vocational training interest. The vocational training program, moreover, should not be devoid of opportunities for the development of cultural and aesthetic interests. There should be a school orchestra and a dramatic society in the vocational school as naturally as in the usual public school.

Another way to vitalize education is to keep life, vigor, and honesty in the textbooks and other teaching material. It is dangerous to use "apt alliteration's artful aid," but I recently succumbed to it in a speech in Boston and criticized textbooks which are purged by patriots and punctuated by public utilities. The child of today cannot be prepared for the world of tomorrow by teaching him from textbooks that try to make him feel that we are still colonists shooting at the redcoats from behind stone walls, that the Japanese are a race of funny little people who spend most of their time feeding silk worms and devouring California babies, that Russia is a country to be mentioned only in a hushed whisper, that anybody who criticizes power companies and other public utilities is a Bolshevik, and so on through all the flat, dull, juiceless pages from which the child is supposed to learn about the world in which he lives.

Finally, the teacher is the crux of the whole problem. Education cannot be handed out like wooden cigars, by a cigar-store Indian. Teachers must not only have native intelligence, a thorough education, and sound professional training, but they must also have personality and the power to stimulate the minds of other human beings. We can kill personality and vigor by requiring too long a day's work, by imposing too heavy a teaching schedule, and by failure to establish special classes for retarded and problem children who need special handling. One problem child saps more teacher-strength than all the rest of the class. We can crush the personality of some teachers by telling them that they will be fired if they get married and of others by firing them because they get divorced. We can crush others by the force of religious or racial prejudices. We can destroy self-respect and a sense of intellectual freedom in some of the best of our teachers by such misguided legislation as that requiring loyalty oaths.

I judge that I shall not be considered a heretic for these utterances, inasmuch as leading school officials have recently been saying similar things with great vigor. Today, as never before, leaders in the educational world are think-

ing in realistic terms. Thinking of this sort alone will make the school a more effective agency in the fight against juvenile delinquency and crime, a fight in which the school can play a part of ever-increasing importance.

#### 4. THE PROBLEM OF MASS EDUCATION<sup>13</sup>

*John Dewey*

Our laudable effort at universal education adds to the premium upon the ready-made article and its mechanical transfer. Big buildings and large classes to each teacher mechanize administration and teaching; time seems to be lacking in which students, young or old, may engage in independent and productive intellectual activity. With so much material to deliver in geography, history, and literature, the sciences and arts, and so many potential consumers to reach, the outcome is a chain-belt system of systematized mass manufacture. It is not, perhaps, surprising that the efforts of those engaged in what is euphemistically called a science of education aim at setting so-called norms which are only averages of large numbers, or that their ideal is to introduce better order and economy into the distribution and delivery system. A large part of the business of teachers as of the sellers of commercial products is to break down sales resistance; for the individual mind of the student retains, save in cases of extreme docility, enough of its individuality to wish to play hookey and to escape loading up with the goods offered. Physical truancy is probably diminishing, but the mental truancy known as not paying attention is still carried on with great success, in spite of the greater attractiveness of the packaged goods.

#### 5. THE CONTRIBUTION OF THE COURSES OF STUDY<sup>14</sup>

*Edwin C. Broome*

*The social studies.*—Of the several subjects of the elementary school curriculum, the social studies—civics, history, and geography—afford probably the richest source of material for character education. The study of the relationship of man to his fellow men and to his environment presupposes a succession of experiences which may be viewed objectively and interpreted in terms of character. It further affords opportunity not only for evaluating and passing judgment upon the lives and conduct of others, but also for self-analysis. Practically every phase of the work in civics, and many in history and geography, are possible of interpretation in terms of personal conduct situations. The application of the experiences of others to the problems of our own life experiences presents an opportunity for effective character building. Let us briefly consider each of these courses of study.

<sup>13</sup> Reprinted from Dewey: *Construction and Criticism*, by permission of Columbia University Press, 1930, pp. 10-11.

<sup>14</sup> From Edwin C. Broome, *Character Education in Elementary Schools*. School District of Philadelphia, 1931, pp. 12-17.

*Civics.*—The Philadelphia Course of Study in Civics might be considered to be a course in direct character education. It is organized around a core of conduct situations classified under the heading of Civic Virtues. A careful examination of the Course in Civics will reveal that these civic virtues are classified and labeled solely for the purpose of convenience of the teacher. They are not abstract ideas, but labels for practical, everyday experiences. They are intended to direct the attention of the teacher to essential conduct situations in the everyday life of the children. The method of instruction suggested is not intended to take the place of actual conduct situations, but to provide material and opportunity for the teacher to present additional experiences in controlled situations that will serve to aid in the interpretation of the more concrete conduct situations.

In using the Course of Study in Civics both in the direct and indirect method of character education, the teacher should keep in mind the unity of the course as a whole. The pigeon-holing of civic virtues in particular grades would be as absurd as would be the thought that any particular virtue could stand in isolation. Any intelligent interpretation of such a course must recognize the interdependence and interrelationship of the several civic virtues and their intimate unity as character elements. The selection of a particular virtue as a means of approach to the problem is made only with the thought of simplifying for purposes of direct instruction the material to be used. When this interrelationship is recognized and the cumulative nature of the problem understood, much of the difficulty of interpretation of the course will disappear.

The more formal content side of the Civics Course presents somewhat the same opportunity for instruction in character education that is afforded in history and geography. The opportunity for viewing from a distance the work of those who serve us in our home community affords material for insuring a knowledge of, an attitude toward, and gradually developing habits of co-operation with our fellow citizens. The teacher should strive to develop in his pupils the habit of interpreting the services rendered by public or private service groups or individuals in terms of principles of conduct. The pupil should be brought to recognize right conduct situations, to like that which is good and to dislike that which is wrong; and to form the habit of conducting himself in his own work and play according to those principles which he has seen to be desirable in others.

*History.*—The History Course of Study is rich in suggestions for use of historical material that may be made to serve effectively in our character education program. It is strong in its emphasis on the value of the "invisible things comprised within the structure of America—patriotic dreams—democratic ideals—valorous deeds—practical achievements—enlightened patriotism." The course abounds in material which serves to give a knowledge of and a proper attitude toward right conduct. Through the opportunity it affords for contact with people of many types, it may make for a wider social experience and a better understanding of others. The social aim is largely stressed, and abun-

dant material is offered throughout the grades for the accomplishment of this end.

The appeal of history is largely to the emotions. We should learn from the study of history, if properly taught, to sympathize with what is great and good, to hate what is base. We can hope to develop ideals from history in so far as we can get the child to admire and contemplate that type of conduct which has proved of social value. The child not only is taught the meaning of virtue in an impressive way, but he is inspired to emulate the hero or heroine. As we present heroes of history, we should emphasize more and more service and self-sacrifice and subsequent social victory as a result of the struggles of this person or that.

History gives opportunity for the exercise of moral judgment. When considering a character, questions similar to the following may be asked:

What was he like? What qualities, traits, or characteristics did he show?  
 Do you like him?  
 Would you want to be like him?  
 Do you like him better than...? Why?  
 Would you have liked his task?  
 What difficulties did he have to overcome?  
 How did he overcome his difficulties?

Children not only try to emulate the heroes themselves, but they look for children who have traits like those of the heroes, or they recognize people in stories who behave like them.

The study of history awakens an understanding of how the present grew out of the past. Children should be encouraged to give expression to their appreciation of the many things we enjoy today because of the service rendered by heroes and peoples of former days.

If applied to the lives of the children, the famous sayings of historical characters may make a valuable contribution to character training.

*Geography.*—In our Course of Study in Civics, we find ourselves going into the field of geography for material to be used in developing a right social attitude. Geography itself is one of the important means by which we come to understand human life. Emphasizing as it does human relationships, geography presents one of the most bountiful sources of supply of material for a study of conduct. It affords us the opportunity of standing off and looking at people in our own and other communities as they are living today. We see them in their homes, their schools, their fields and workshops, their churches and their governments. We see some doing things by methods different from our own. We learn of the dependence and interdependence of men on the earth and of the contribution each is making to the welfare of the others. Situations should be set that will afford the pupils opportunity to interpret the lives of these people in terms of conduct and to recognize the operation of the fundamental principles of character they have met in other situations.

Geography affords many striking illustrations of countries handicapped by disadvantages of climate, soil, small area, and dense population, yet, because of the high courage, the perseverance, and industry of their people, they have been able to support their population and, in addition, make a distinct contribution to the civilization of the world. England, Denmark, Switzerland, and Japan are excellent examples. These countries might be used particularly in the higher grades to show that success does not necessarily depend alone upon natural resources, but upon the use made of them, and that courage, perseverance, and industry can overcome difficulties that seem insurmountable.

*Nature study.*—The greatest contribution of nature study in the field of character education is in relation to the worthy use of leisure. A love for any phase of nature, kindled in childhood, contributes greatly to the pleasures and recreations of later life. If we can awaken a permanent interest in flowers, trees, birds, butterflies, insects, etc., unworthy, degrading pleasures are not likely to find a very prominent place in the individual's life, for the young person will continue always to find "tongues in trees, books in the running brooks, sermons in stones, and good in everything."

The humane spirit is also developed. The child who learns to respect life and not to cause unnecessary pain even to the humblest creature is making progress toward living in right relations with his fellow men.

*English.*—The subject of English occupies a large and important place in the elementary curriculum. It covers so wide a field and is so rich in content that it cannot help but play an important part in any discussion of the character education values of the curriculum. It must be kept in mind that the two fundamental purposes of the English Course of Study are "expression" and "appreciation." Its contribution to the character education program must, to be sure, be indirect. There is no thought that the teacher should turn the lesson in appreciation into a lesson on a civic virtue. "To point the moral and adorn the tale" is of doubtful wisdom even when a story has been told for the definite purpose of instructing in a civic virtue. Much less, therefore, should such a method be applied in the field of English appreciation. The field of literature, both prose and poetry, abounds in a wealth of material that will serve splendidly to reinforce the more direct character education work. In the field of written English, the interpretation of conduct situations will afford excellent material for written work and may be made to motivate such work effectively. The preparation of articles on conduct for the school paper and the use of oral English in the form of talks before the class or assembly on conduct problems afford other opportunities for the effective use of the English Course of Study.

The prose and poetry listed in the Course of Study for each grade abound in incidents which embody trait actions. We find in them a rich storehouse of ideals and of methods used in achieving these ideals. The children should be led to recognize and discuss the conduct traits exhibited by the characters found in books. These characters should be used by the children to interpret

their own acts and those of others. Suggestions: "Do you like the boy in the story?" "Why?" "Did he make a wise or unwise choice?"

The story possesses superiority as a means of instruction because it releases vivid emotions within the child, causing him to feel intensely. The artistic storyteller secures his emotional effects by the wise selection of words and by his dramatic interpretation of the story. All hearts respond to the subtle claim of his art.

If the story pulses with life and action and the storyteller loves it, it will interpret itself. Often the character makes its own appeal, so that appreciative telling is all that is necessary. A word or two of interpretation may help us to enjoy a picture; so sometimes a word or two of suggestion may heighten the appeal of a story already loved for its own sake. For instance, after enjoying a story of obstacles overcome, children do not resent the question that reminds them of incidents in their own lives when obstacles have yielded to persistent attacks. We learn from a story by applying the thought directly to another situation.

*Health education.*—When Emerson said "what you are speaks so loud that I cannot hear what you say" he obviously was evaluating character. Among the manifestations of character there are many which have a background in health education. Since it is agreed that character may be largely appraised in that behavior which expresses consideration for others, we have excellent opportunities in health education for securing this outcome. The Course of Study in Grades One to Three concerns itself primarily with activities leading to the development of desirable health habits. Among these are such activities as keeping the skin clean, appendages well cared for, teeth in good condition, and other practices pertaining to posture and environmental cleanliness. The development of these habits should be motivated, not only by reference to the immediate values resulting from the prevention and checking of disease, but also by reference to personal pride and self-respect.

In promoting desirable habits with reference to environmental cleanliness, we have great possibilities of developing a consideration for others. Any normal child is reluctant to eat his lunch on a messy table or drink from a dirty bubbler. With this background, a powerful motive for developing in each child a consideration for the comfort and happiness of the group is provided. The same appeal may be made with regard to the use of toilets, desks, play supplies, corridors, and fire escapes. So closely associated is the development of these health habits with the development of desirable character habits that in many situations the difference is one of terminology.

As these habits are acquired, more and more attention should be given to the reasons and information underlying healthful practices. As this gradual shift in emphasis takes place, the individual has an increasing opportunity to exercise intelligent self-direction in practicing the best form of health conduct. In this respect, much consideration should be given to the development of favorable attitudes toward food habits and the need for suitable periods of rest and sleep, recreation, and exercise. Even though these opportunities

may be regarded as methods of promoting health, they are equally valuable in building character. When an individual chooses to retire regularly at an early hour in preference to going out with his fellows, or refrains from over-eating, or makes sacrifices to keep himself clean and neat, he is not only promoting good health but at the same time is exercising qualities of control and direction which produce character.

## 6. CHARACTER IMPLICATIONS IN THE STUDY OF MATHEMATICS<sup>15</sup>

*E. B. Crowley*

The need of character training as an integral part of our educational work is probably apparent to everyone. Many educators have come to the conclusion that practically every activity in the curriculum presents opportunities for character education. Moreover, the extensive and rapidly growing literature treats many aspects of the subject. Hence, it is difficult to understand why writers ignore mathematics as a contributing factor in the development of character. Let us ask whether this ancient, but ever-growing subject of mathematics can offer to the restless, forward-looking, inquiring, speed-loving boys and girls anything that will help them to solve their problems of everyday living and thus to develop those attitudes that are such an essential part of character education.

Many of the difficulties which these young folks are meeting today are due, in large measure, to their failure to grasp the relation of cause and effect. Mathematics, the science of necessary conclusions, can be made a powerful instrument in leading high school students to see that certain causes produce certain results. The branch of mathematics known as geometry is especially well adapted for use in this way. But no amount of time and effort spent upon the study of this subject will be of avail unless the student grasps the significance of the omnipresent "if, then."

The teacher must direct the student's attention again and again to the idea that every theorem states that if certain things are given (or assumed or guaranteed), then certain results follow. The pupil must not only acquire the habit of proving statements set before him, but must also gain skill in finding what results can be expected when certain geometric conditions are given, and what set (or sets) of causes would be sufficient to produce certain results which are known.

The student must also be led to see that the relation of cause and effect is not confined to geometry textbooks, but abounds in all the work and play of his daily life. If we wish to have the "if, then" relation functioning in life, a conscious effort must be made to place geometry in the realm of life and to bring life into the realm of geometry. Simple and obvious cases of cause and effect that are not purely geometric must be discussed in the classroom. Take, for example, "If a child puts his hand on a hot stove, he is burned," or

<sup>15</sup> From E. B. Crowley, "Mathematics and Character Education." *Junior-Senior High School Clearing House*, 10, 1936, pp. 279, 280, 282.

"If a glass dish falls from a table to a concrete floor, it is broken." Cases of cause and effect are easily found in many of the school activities. For example, in a senior high school "homeroom" where the pupils were in the first semester of the eleventh school year, the monthly attendance report was marred by too much tardiness. The teacher discussed the matter with the class at a weekly homeroom period. On motion, the matter was referred to the attendance committee. They borrowed the teacher's rollbook and studied it for themselves. The next week they reported to the homeroom that three-fourths of the tardy marks were due to one boy. The chairman said, "I shall not mention his name, but the committee hopes that he will find the cause and remove it. He never studies geometry, but every one on the committee did and of course we know the 'if, then' relation." Two weeks later the boy was again tardy. The committee had a conference with the culprit and decided that the cause was oversleeping. One of the boys volunteered to telephone each school morning at seven o'clock to the culprit's mother and ask her to awaken him. He was tardy only once again during the semester.

In contrast to this severe side of mathematics there is a lighter, a recreational, aspect that is of importance in these days when we are facing the dangers of increasing the leisure time of those who do not know how to use it worthily. In classrooms, some attention should be given to the mathematics that enter into many popular games and also to the possibilities of recreational puzzles derived from mathematics. There are books that are rich mines of such material.

Although many high school pupils have heard of *Alice in Wonderland*, few of them know that Lewis Carroll was Charles Dodgson, a mathematician of Oxford University, England, who could write mathematical books and also delightful nonsense such as *Alice*. The pupil who has grasped the possibilities of leisure will not be satisfied to spend much time or money on those commercialized recreations that convey cheap and tawdry and even pernicious ideas.

Mathematics is subtle. In fact it is so subtle that many persons, who think they know the subject, fail to grasp its fine points. The teaching of mathematics can have no value as an aid in character education if a drillmaster sitting in the teacher's chair does nothing more than compel students to solve problems and to memorize definitions, axioms, and proofs verbatim so that, at a given signal (such as a test or an examination) they can produce this material in a form which is letter-perfect. Students who have been subjected to this regime fail to realize that mathematics is a science of necessary conclusions, that it requires strict attention to all the conditions of the problem in hand, that it permits no guessing, that it wrestles with difficulties, and that it can be a source of pleasure and profit in leisure time.

The generalizations of mathematics, its calmness and serenity, have been achieved by the combination of patient toil and far-flung vision. It had its origin in the heat and struggle of common and humble problems of everyday



life. Today, as in the past, it is helped by difficult problems which confront man in various fields.

Mathematics becomes worth while to the pupil of today when presented in a fresh and vital manner, tied up with modern living conditions. When the student approaches mathematics in this way, he gains attitudes that are an essential part of character education.

## VI. The Growth of Character in the Home

The primary responsibility of the home in fostering the character education of youth has remained unquestioned except perhaps in the case of certain social experiments of recent times. Although many functions performed by the pioneer home have since been delegated to other institutions, the home remains the unifying and integrating agency in which are fulfilled emotional and spiritual needs that can be met in no other manner. In view of the statistical evidence on crime and social maladjustment, however, the increase in divorces and broken homes presents to the character specialist a serious situation.

### I. IMPORTANCE OF HOME AND SCHOOL CO-OPERATION<sup>16</sup>

#### *Superintendent's Report Milwaukee, Wisconsin*

Sometimes school difficulty is caused by family instability. The foreign family presents the problem of variation of social standards and the attitudes of parents and children toward each other. Foreign parents sometimes fail to understand the reasons for compulsory school attendance. There is a weakening of the family bonds brought about by social conflict because the foreign people do not have the same social contacts with people or institutions as have their children. Congested living conditions tend to weaken the established social controls and foster social laxity, degeneration, and recklessness. Insecurity of employment, unemployment, employment of women in industry, and increased costs of living necessitating that women and children supplement the family income are all factors which affect the lives of children in school.

Sometimes school difficulty is caused by lack of contact between the home and school. Relations between parents and teachers of public schools a century ago were very close; teachers had many contacts with homes and gained an intimate knowledge of the home life of their pupils. During the second quarter of the nineteenth century, conditions in home and school began to undergo changes. Drifts of population to cities, high specialization of industries, development of rapid transit, which has made it possible to deliver merchandise to the remotest parts of the country, have changed the organization of home life even in rural communities. As schools grew, social relations between home and school disappeared until, at present, parents and teachers

<sup>16</sup> From *Seventy-Fourth Annual Report of the Superintendent of Schools, Milwaukee, Wisconsin*, 1933, pp. 24-25.

often do not meet. As a result, teachers feel a lack of co-operation and harmony and sympathy on the part of the parents of their pupils while parents regard the school as an outside institution.

Our parent-teacher organizations are working diligently to do their part in maintaining contacts. Many of our schools are supplementing this work with special invitations and projects calling for parental co-operation. Pre-school mothers form study groups to consider matters of importance to the welfare of the child at this age. Some kindergarten teachers keep in touch with mothers through a supply of articles, pamphlets, and books which they circulate among them.

If some maladjustments are to be remedied, contact with the home is imperative. It would be ideal if it were possible for the classroom teacher in all schools to visit the homes of the children so as to comprehend the whole child and take into account his attitudes and responsibilities outside of the school as well as inside. Many Milwaukee teachers do visit the homes of some of their pupils, but in most cases they must depend upon our staff of home visitors to do this work.

## 2. THE EFFECT OF PHYSICAL DISABILITY ON CHARACTER<sup>17</sup>

*Alfred Adler*

Case histories often show the beginning of psychological troubles after such diseases as whooping cough, encephalitis, chorea, etc. One imagines that it is these illnesses which are the causes of psychological difficulties. But they are really only the occasions that bring about the hidden character flows in the child. During his illness, the child feels his power and discovers how he can rule the family. He has seen terror and anxiety on the parents' faces during the illness and knows that it is all on his account. After the illness he wants to continue to be the center of attention and does this by trying to dominate the parents with his whims and demands. This, of course, happens with a child who has never been socially trained and needs only the occasion to manifest his egoistic strivings.

On the other hand, it is interesting to note that sometimes an illness may be the occasion of an improvement in the character of the child. There is the case of a second child of a schoolteacher. The teacher had been very much concerned over this boy and had not known what to do with him. He would run away from home at times and was always the worst pupil in his class at school. One day, just as the father was about to send him away to a reformatory, the boy was discovered to be suffering from tuberculosis of the hip. This is a disease which requires the constant care of the parents over a long period. When the boy finally recovered, he became the best child in the family. All that the boy needed was the extra attention from the parents that was provided by the illness. The reason he had been disobedient before was

<sup>17</sup> From Alfred Adler, *The Education of Children* (translated by Eleanore and Friedrich Jensen). New York: Greenberg Publisher, Inc., 1930, pp. 192-194.

because he had always felt himself to be in the shadow of a brilliant older brother. Since he could not be appreciated like his brother, he was always fighting. But the illness convinced him that he, too, could be appreciated by his parents in the way that his older brother was, and so he learned to behave well.

## VII. The Influence on Character of Social Institutions Outside of the Home and School

The caution to be observed with regard to the influence on character of the lesser social institutions is to see that they supplement but do not replace the home and school. Listening to radio programs or playing on athletic teams may well be a pleasant and profitable way for the child to amuse himself so long as these activities do not encroach upon study periods or time that should be spent with the family group. Certainly, however, the child would be at a great disadvantage who was protected from any contacts with the various institutions of modern life and could thus never be capable of exercising judgment in the choice of what was good for him. In the selections reproduced herewith special emphasis is placed upon radio and motion pictures, these being two of the newest and most powerful forces in our social environment. Yearly they are ascending to incalculable heights of influence—whether for good or for evil—on public taste and opinion.

### I. THE FORCE OF COMPANIONSHIP ON THE FORMATION OF CHARACTER<sup>18</sup>

*Mark A. May*

Consider next the out-of-home-and-school aspect of environment. Among the most important of these for character are companions or associates, leisure time, recreations, and membership in social organizations such as clubs and teams.

The data now available amply confirm the popular belief that companions or associates are among the most important factors in character development. The Character Education Inquiry obtained higher correlations among the honesty scores of associates, especially if they are in the same schoolroom, than among any other variables. When two boys who are friends or chums are in the same classroom, if one cheats the other is very likely to cheat also. In his elaborate study of many thousand delinquents, Healy came to the conclusion that companions are the most potent force in criminal tendencies. When the boy drifts in with a bad gang, the rest of the story is well known. Healy's figure shows that bad companions are an important factor in 62 per cent of his cases. Burt's percentages do not run as high, yet he classes it as a major factor. Certain studies have been made on the motives that lead boys to choose certain companionships. These associations are usually made in school or in the streets or on the playground, and are in many instances

<sup>18</sup> From Mark A. May, "What Science Offers on Character Education." *Building Character*, Proceedings of the Mid-West Conference on Character Development. Chicago: The University of Chicago Press, February, 1928, pp. 28-29.

matters of chance. Yet on the other hand, there is still evidence for believing that "birds of a feather" tend to flock in the same fields. Here again, it is quite likely that companionship alone is simply one factor in the whole chain of circumstances that leads to crime.

## 2. RADIO AS A CULTURAL AGENT IN THE AMERICAN HOME <sup>19</sup>

*Robert G. Sproul*

To sum up my attitude toward radio broadcasting as a cultural agent: Any means of communication that reaches more than seventeen million homes in the United States, many of which lack every other type of cultural stimulus, is obviously potentially useful in the promotion of the public weal and the building and nurture of American ideals. Experiments conducted during the past twelve years, in spite of numerous and heavy handicaps, have confirmed the practicability of this usefulness. Not only has the radio been shown to be a valuable supplement to school instruction, but it has been demonstrated to be even more valuable as a stimulus to the intellectual and spiritual—the culture, if you will—of the adult population.

If we are to avail ourselves fully of this usefulness, especially in the latter field, we must begin by realizing that the majority of people are not now in agreement with us in our ideas concerning what radio broadcasting should be. If the twelve years of the entertainment which has been furnished them seemingly free had failed to determine their attitude in that respect, it would be proof that the instrument is worthless as a molder of public opinion. Again I would repeat: The fact that a majority of people passively accept the programs which now come to them is not a legitimate nor sufficient reason for permitting present practices of radio to rule in the future.

As I see it, radio as a cultural instrument is less effective and less important in formal education than it is in the less tangible field of persistent intellectual stimulus and spiritual awakening of ever larger numbers of our adult citizens. Our schools can get along quite well without the aid of radio, although with its aid their work can be strengthened. The real problem that America faces is to keep alive the intellectual and spiritual sparks after our people have finished their formal schooling. To date, we have not even approached a solution of this problem. Radio provides a way. Through the radio we are given a peculiar opportunity and a special ability to give to those passing out from the schools the opportunities, the benefits, and the pleasures of education all their lives, not necessarily by formal instruction but by furnishing current information concerning interesting phases of civilized life, and by providing inspiration that will lead individuals to seek further instruction—in night schools, in university extension divisions, and elsewhere.

In this era of change, with its steadily increasing proportion of leisure

<sup>19</sup> From Robert G. Sproul, "Radio: An Instrument of Culture or an Agent of Confusion." *Radio and Education*, Proceedings of the Fourth Annual Assembly of the National Advisory Council on Radio in Education, Inc. Chicago: The University of Chicago Press, 1935, pp. 40-41.

time, it is imperative that radio broadcasting shall be an instrument of culture and not an agency of confusion. The future of America depends upon our ability to disprove by means of education Lord Macaulay's dictum that democracy is government by count of the polls of the ignorant. Of this process, if it takes place, radio must be an integral part. The public can get its advertising from other media. Entertainment in abundance can be found elsewhere. But nowhere else and through no other agency can the multitude which is democratic come into possession of the cultural intelligence that is essential to the preservation of the national ideals we have inherited, and to the conception of finer, nobler ideals to insure our continuing growth.

### 3. CUMULATIVE EFFECTS OF THE MOTION-PICTURE HABIT ON CHARACTER<sup>20</sup>

*Ruth C. Peterson*

The problem of the cumulative effect of two or more pictures pertaining to the same issue was studied in experiments at Mooseheart, Illinois. The results indicate that two pictures, neither of which has a significant effect on attitude, may have such an effect on the attitudes of a group who see both pictures. It was found that three pictures, seen at intervals of a week, had a cumulative effect on attitude.

The question arose concerning the persistence of the effect of a motion picture on attitude. The changes in attitude, as a result of seeing a picture, were measured the day following the presentation of the film. The attitudes of the students who had participated in the experiments were measured again after intervals ranging from ten weeks to nineteen months. These subsequent measurements of attitudes showed that the effect of a motion picture on attitude persisted, although there was some return toward the position held before the picture was presented.

In conclusion, we may say that the experiments we conducted show that motion pictures have definite, lasting effects on the social attitudes of children.

### 4. THE MOVING-PICTURE VIEW OF LIFE<sup>21</sup>

*Jane Addams*

Differences in social attitudes work in all kinds of ways. I would like to say something about the children of the radicals. The parents do not need to be very radical, but merely to differ from the rest of society. I know a little girl who suffered horribly because her mother was a vegetarian. She could hardly stand it because her mother did not take a plate of food and consume

<sup>20</sup> From Ruth C. Peterson, "The Effect of Motion Pictures on the Social Attitudes of Children." *Developing Attitudes in Children*, Proceedings of the Mid-West Conference of the Chicago Association for Child Study and Parent Education, March, 1932. Chicago: The University of Chicago Press, pp. 105-106.

<sup>21</sup> From Jane Addams, "Social Attitudes and Character." *Building Character*, Proceedings of the Mid-West Conference on Character Development, February, 1928. Chicago: The University of Chicago Press, pp. 293-294.

it as other people did. It seemed to her very disgraceful. The child, of course, was an example of the children who like to conform and resent all differences.

Another thing complicates the whole situation among the children of immigrants. That is the moving pictures. They have in their mind these two ideals: the life which they see about them at home and in their own colony and the life which they see depicted on the screen. They are very much interested, of course, in the moving-picture shows, and yet they get a very curious impression. Almost always they receive an impression of domestic infelicity which is horribly exaggerated, and that often throws them back with a sense of gratitude for the simple families in which they have been born. They get a very curious impression of American clothes and American houses, which of course they admire very much, especially the grand ones. They get, outside of that, a great range of what we might call geographic releases. They are enormously interested in the parts of the world which are portrayed, often incidentally, in the moving picture. But it brings a clash between what they constantly admire and grow familiar with on the one hand, and their daily home experiences on the other.

## 5. INCONSISTENCIES IN SOCIAL PRACTICE AS AN EFFECT ON CHARACTER<sup>22</sup>

*Kenneth L. Heaton*

The individual never outgrows some of the urges that are dominant during infancy. Through life he tends to repeat those forms of behavior that have brought physical comfort and pleasure, that have won the approval of his associates, that have given a sense of security and achievement in all life's relationships. At the same time the individual tends to avoid those patterns of conduct which have robbed him of the feeling of belonging to social groups, that have given a sense of insecurity and failure. Neither does the individual outgrow, at any time in his life, the tendency to imitate the actions, the ideals, the interest, the attitudes, of those about him.

These urges are not very simple in their operation after the first few weeks of life and grow increasingly confusing with the widening span of life. There is no single pattern of life which brings satisfaction or dissatisfaction, no single pattern of life which the growing child may imitate. Each home represented in the neighborhood play group, the school group and each family represented in it, the church group and its complex of personnel, the movies, the daily newspaper, the radio broadcast, the downtown gang that sells papers, the playground group, the boys' or girls' club, the girl friend or boy friend, the vocation and vocational group—each represents its own standards of life and sets up its own scheme of satisfactions and dissatisfactions. Even within these groups there are conflicts, since father may not agree with mother and neither one of them with grandmother and grandfather, and the schoolteachers may not agree with one another. Furthermore, the things that father says

<sup>22</sup> From Kenneth L. Heaton, *The Character Emphasis in Education*. Chicago: The University of Chicago Press, 1933, pp. 365-366.

over the telephone, or in filling out his income tax report, or when he goes to the club may not agree at all with what he advocates for Johnny. Mary may discover that her mother or teacher is not altogether consistent in what she does when she thinks that Mary is not around.

Honesty is a desirable characteristic when mother asks son to tell the truth but may not be equally desirable to that same mother when an unbidden guest arrives, or to the other paper boy when he has an opportunity to short-change a patron, or to the movie hero when he sees a chance to put over a good business deal or rob a bank. Ambition is a good thing, the teacher says, but Mary urges Johnny to forget his lessons and take her to a party and the boy across the aisle in English class is going to quit high school in time to go fishing when the trout season opens. And so, in thousands of ways, the various influences in the child's life are in conflict, and often the sermon is not in harmony with the life of the one who preaches. No wonder that the child is confused and inconsistent and fails to develop satisfactory ideals and habits of life.

### VIII. Methods in Character Education

This, of course, is at the heart of the problem. Diagnosis has been treated fairly adequately and a social awareness developed of the need for character training. Furthermore, the matter of definition and diagnosis can remain a theoretical one while the application of remedial methods is not only a practical but urgent necessity, crime and delinquency statistics and social maladjustments being what they are.

Science has given us a civilization on a relatively high technical plane with tools and mechanisms of delicate precision, but it has not shown us how the layman can safely be entrusted with great responsibility. It has not explained how the mass of people can be taught to make profitable use of the leisure made available by a scientific age. This remains the problem for the specialist in character and for the parent, the teacher, the religious leader, and others. Many interesting practical experiments are being carried out in the character education program, most of these being conducted in the schools. There is little likelihood that many standardized methods can ever be safely introduced into the character training movement. However, there is certainly room for improvement in the adaptation of methods to individuals or special groups, and more searching investigations can be carried out with the special objectives of improving such factors as measurement.

#### I. ATTITUDES AS VIRTUES <sup>23</sup>

*Hugh Hartshorne*

The first, or direct, view may be illustrated by common methods of teaching such attitudes as kindness. The attitude is illustrated by a story or is merely described or referred to by name. Perhaps the story of the Good Samaritan is told. His kindness is noted as a desirable trait and included in

<sup>23</sup> From Hugh Hartshorne, "How Can Ethical Attitudes Be Taught?" *Developing Attitudes in Children*, Proceedings of the Mid-West Conference of the Chicago Association for Child Study and Parent Education, March, 1932. Chicago: The University of Chicago Press, pp. 8-11.

a list of virtues to be acquired. Sometimes it is suggested that possibly some poor people may be found on whom the trait may be practiced. Thus, we make those who are in need act as the occasion for the development of what is euphemistically called our "character."

Here are excerpts from observation of a class session which illustrates certain difficulties that are likely to arise when this procedure is used:

*A class on "How to Control My Temper."*—The teacher asks, "What do you suppose are some of the things which make people lose their tempers?"

The children answer variously as follows:

"A brother."

"A sister."

"Teasing."

"A bigger brother teasing a little one, or a little sister."

"A sister can tease too."

"I know one: being a hard loser."

"Sometimes fellows get sore if you try to play fair."

"I got a fierce temper. I biffed one once because he made me sore, Oh, boy!"

"I was bringing home the bacon once. A boy tagged me and made me drop it. I lost my temper. Boy! I hit him! He didn't do it again."

"My brother was sitting and reading, and I swatted him one and he lost his temper."

"I took out my dog and my mother called me in and I lost my temper (cheerfully)."

"A game is interesting and then your mother asks you to come in."

At this point the children read a story of someone who lost his temper, and they evidently find themselves very well pictured in it. They discuss historic characters that presumably became angry, particularly Abraham Lincoln.

The teacher then asks, "Could this thing called 'temper' or 'energy' be used for some good cause?"

"Yes, it could be; sometimes it busts things up."

"A lot of times it does."

"Sometimes a fellow is sorry after it is over."

At this point two twins got to tussling, and the teacher says, "Do you remember when Abraham Lincoln got angry he was just angry in his mind?" to which one of the twins replies, "Well, he was hitting me."

Teacher: "What did we say about power for a good purpose? Should we not save our energy for something good?"

Boy: "I would like to show him how it feels."

Another boy: "I know someone who hit a person in the nose. It ended seriously. I did it."

Teacher: "Were you sorry afterward?"

Boy: "Well, yes and no."

Another boy: "A little boy hit me with a horsewhip. I grabbed it, got hold of him and knocked him down."

Teacher: "Were you real, real happy? Did you have a good feeling?"

Boy: "Not *so* happy, but quite happy."

Evidently the teacher was drawing attention not to the consequences of anger upon others but to the virtuous feeling which is supposed to result from



its suppression. Even if the teacher should succeed in establishing by this method any relevant attitudes at all, they would not be ethical, as they would be neither disinterested nor attached to their proper objects.

*Attitudes as concomitants.*—The second view is represented at its best by what is commonly called the “project method.” Before attempting to suggest certain limitations in this method, I will illustrate its operation from another classroom observation.

Knowing the customary unsocial attitude of the community toward foreigners, a teacher set out to counteract it in her second-grade pupils. She brought to the class a lot of small objects and toys made in foreign lands. The children were, of course, delighted with them and wanted to know where they came from and who had made them. This led to a discussion of the countries from which not only such objects but also many of our fellow citizens come, bringing their families and passing through Ellis Island. The teacher reported the delays sometimes incident to entry, and the children wanted to give a party for the Ellis Island children. This was impossible; but the teacher knew of a church to which many immigrants went, and her pupils invited a group of children from this church to a Thanksgiving party. They came in costume, equalizing differences in dress that otherwise might have influenced the attitudes of each group toward the other. They shared games, toys, and refreshments, and together witnessed a play given by children from a neighboring orphanage, based on Pinocchio, with which all the children were familiar. A climax of genuine emotional sharing was reached when the actors showed Pinocchio refusing to take castor oil until the Blue Fairy had given him a piece of candy. The shout of joy that rose from the audience was a real amalgamator—evidently castor oil has unrealized potentialities!

On another occasion the downtown children returned to share in a service of worship; and later the uptown children went downtown to an Easter party—an “Indian party,” with turbans for all furnished by the visitors.

No claim was made for the permanence of the attitudes of friendship and mutual respect that resulted from this sharing of experiences; but should they continue, there is little doubt that they would cut deep into the antagonism and contempt characteristic of the attitude of many communities toward foreigners.

## 2. WHAT CAN BE SAID FOR DIRECT MORAL INSTRUCTION <sup>24</sup>

*Henry Neumann*

There are often good reasons for doubting whether a systematic, regularly scheduled moral instruction is worth the effort it requires. Many a preacher, for instance, finds himself wondering what effects have been wrought by all his years of expounding and exhorting. He thinks of merchants in his congregation who are not conspicuous in the community for

<sup>24</sup> From Henry Neumann, *Lives in the Making*. New York: D. Appleton-Century Company, 1932, pp. 228-232.

their uprightness. There are women who come to his church more or less frequently, but whom their neighbors still regard correctly as rather frivolous persons. To be sure, he can think of some instances where the lives of his parishioners have been changed for the better. But he is in doubt whether much, if any, of this effect can be honestly ascribed to his teaching. He wonders whether the fruits of all his year's preaching are not ridiculously out of proportion to the energy expended. He can sympathize with the sardonic remark of George Eliot, "After long study of ethics, men sometimes succeed in conducting themselves almost as well as before."

Such reflections come also to other people interested in character training. Parents and teachers often entertain such doubts. They know that it is not what children or adults hear that transforms them into better people, but what they do. What good is there in lessons on goodness? Skill in tennis cannot be learned out of a book or out of the most vivid talk on the subject. The much more difficult art of living comes under the same rules. "I had rather feel compunction," said Thomas à Kempis, "than understand the definition of it." He might have added that without the feeling, there could be no real understanding.

*The need for instruction.*—These are the most important of the objections urged against direct moral instruction. But they are not final. "Another subject added to the curriculum?" Yes, if the need warrants; and if the addition can be made effective. "Teachers do not care; and those who do care are unskilled." But this indicates rather that the work be left to teachers who do have the necessary enthusiasm, skill, and training. "Children may look upon the ethics as just another subject with no relation to the rest of their school work." This again is an objection not to the teaching itself but to the poorer kind. Not all graduates of high school read excellent books and plays for the rest of their lives. But this is surely no reason for dropping Shakespeare now.

In spite of the many instances where attempts to reach conduct through lectures, talks, recitations, are quite futile, much is to be said for this method when it is employed along with all the other resources at our command. If it is offered as a substitute for living experiences, it is not only useless but likely to do harm by associating the subject in children's minds with disgust. Life is learned by living, as the preceding chapter is intended to remind. "The issues of life are out of the heart," not out of the intellect. But these considerations do not impair the case for a moral instruction which remembers what children can be expected to grasp at given stages of their lives, which is offered by skilled, inspired and inspiring teachers, which is employed in company with such other agencies as this book treats, and which is presented on regularly scheduled occasions even before the children meet crises in their experience or feel any keen desire for such instruction.

The fact is that whether or not we care to "teach morals," the need is thrust upon us by the circumstances that all the time children are being taught, by one another and by grown-ups, deliberately or otherwise. When they hear playmates speak words of contempt about peoples of other religions, or social

standing, or nationality, or race, they are getting ideas, unfortunately of an undesirable kind. A high-school lad was overheard remarking about his teachers to a group of admiring classmates: "I can bluff the whole bunch to a standstill, and then they want to tell me how to succeed." He, too, was offering moral instruction. From one another, children are constantly getting all sorts of ideas about sex. The mother who says, "I do not want my child to learn about these matters until he is older" forgets that other beings do not entertain her scruples. Children on the streets, the servant in the kitchen—many people are teaching her child every day. Boys and girls read books, look at pictures, attend talkies, read newspapers, laugh over the conduct in comic strips, hear conversations. If a child hears somebody tell gleefully how he made "easy money" by a shabby method, that child is receiving a lesson in one kind of morals. On every hand children are being taught what it would be better for them not to learn. If we ask, therefore, whether instruction in ethics should be offered, we must remember that the real problem is not whether such lessons should be given or not, but rather whether useful lessons instead of hurtful ones should be offered, and also whether the teaching should come from informed and responsible people instead of the uninformed and irresponsible.

Moreover, to anticipate a common objection, children are not altogether unwilling to listen—when the lesson is not all monologue or not too lengthy or preachy. They want to know about life and how to manage it wisely. They have their more or less clear ideas of what they intend to do in the years ahead, and they are ready enough to hear counsel which they think may be of help.

Furthermore, though many of the most carefully prepared lessons, such as those sermons of the preacher, bring little result, nevertheless, what good effects do come from them are eminently worth the effort. Each one of us perhaps can recall some word that at some time or other helped him. It may have been a formal address or sermon, or it may have been a simple conversation. It may have been some recommendation that we heard in the course of a talk, possibly the advice to read a book that did exercise an influence upon our thinking and our acting. "Books have helped me," is a topic to which our young people do not at all object. People, young and old, still advise one another what to read, what to see in the theater, and what to think. They go to the play in which a married woman eats her heart out because she is in love with a friend of her husband's. They see other plays of this type and come to think that the triangle plot is a true picture of most marriages. Is it, therefore, foolish or unimportant to try to convince them that such a view of life is unsound? Or should we sit back and let them grow up like those children of whom Socrates spoke? "They were allowed to wander at their own free will in a sort of hope that they would light upon virtue of their own accord."

It is still reasonable, therefore, to hope that no matter how much the times have changed, something can still be done to help our young people

inform their judgments upon vital questions of good, better, and best. Long ago this problem was raised by Plato. Socrates expresses a doubt whether virtue can be taught. Protagoras insists that it can; and in reply to the question, "Where are the teachers?" he replies, "You might as well ask, 'Who teaches Greek?'" The fact is, all men are its [the child's] teachers—parents, guardians, tutors, the law, society—each and all do their part. If the influence of all these forces is so often of the mixed kind that has been mentioned, this simply means that we must do our utmost to make the wiser thinking more effective.

We should count the school a failure if, in this modern world, boys and girls used an electric light without some acquaintance with the principles of science. This knowledge we do not leave to the mercy of accident. We give teachers a special training in the aims and methods. The day will come when we shall have far more teachers than at present, specially trained to guide young people on principles even more fundamental than knowing how atoms behave, namely, the business of right behavior for human beings.

### 3. SELF-CONTROL AS A MEANS TO CHARACTER <sup>25</sup>

*Hugh Hartshorne*

We are confronted today as never before with the problem of temperance as a way of life. Increasing the freedom of childhood and youth means necessarily the letting down of adult control. Authority lapses into advice, and compulsion into suggestion. The old-fashioned temperance lesson exalted the ideal of self-control, but the old-fashioned parent gave his children small chance to practice it. The new-fashioned parent doesn't have to tell his child he may do as he likes. He does anyway. In neither method is there any serious effort to substitute for the dictation of the parent or of teachers or of law an educational process by which the child can achieve genuine moral independence.

The problem centers around what we mean by self-control. A brief analysis of this sort of behavior will suggest the nature of experiences that will be required for achieving it.

The "control" aspect of the term self-control is fairly obvious. It is not at once obvious whether the self is to be controlled or to do the controlling. Perhaps both. Certainly the self has to be under control. But the implication of the term is that the self is also doing the controlling. Evidently what we mean is that one part of the self controls another part of the self. This would not make sense unless one part were in conflict with another part, and there could be no conflict without movement or at least direction of impulse. Conflict of movement or impulse can be resolved only as one of the contending forces leaves the field. As this hardly happens voluntarily, something outside the particular impulse or desire involved must be at work to prevent its action.

<sup>25</sup> From Hugh Hartshorne, *Character in Human Relations*. New York: Charles Scribner's Sons, 1932, pp. 268-270.

If it were merely some single alternative desire, the stronger would win out. But a resolution of this sort, as between hunger and fear, could hardly be termed self-control.

The human organism is not limited, however, to this type of pluralistic conflict among its desires. There is a certain momentum from past experiences always at work so that each new impulse as it arises is in potential conflict with the general direction in which the whole organism is moving. Furthermore, with experience and reflection, this general direction of movement gains definition and is criticized in terms of other possible direction, and a new or slightly modified direction is projected as an ideal, which acts as a purpose to weight and select each impulse in accordance with its capacity to move the self toward the ideal. Self-control is the control of all impulses in the interest of the ideal which is cherished by the self as its own.

Genuine self-control, therefore, cannot be the result of either compulsion or propaganda. It must grow through experience in forming and pursuing ideals, in adjusting means to ends, in inhibiting impulses which lead away from rather than toward the goal which has been set up.

Each step toward the new society is written into the laws and customs of the land. Some of these new structures that are built are wise and some turn out to be mistaken, or at least only scaffolding to be removed as the building grows. If the building is to proceed efficiently a certain *esprit de corps* is needed among those who use it—a sportsmanlike accommodation to the limitations of an imperfect structure as well as a common will to see the building go on toward its completion, or its reconstruction.

The discipline of arbitrary control and the riot of untamed experiment alike prevent the development of characters that are competent for the reconstructive tasks of our generation. What is needed is training in the technique of self-control—in the discipline of self, the inhibition of all desires which prevent the realization of that alone which makes desire and satisfaction possible in human society. To achieve that act of will which wills the whole, which yields its own special privilege to the good of all, is the condition of both "character" and "democracy."

#### 4. CHARACTER EDUCATION AND THE CURRICULUM <sup>26</sup>

J. R. Jewell and R. C. Blackler

Character, always the ultimate end of education, has through the ages been considered as best reached by indirect means. Only recently has it been given consideration commensurate in any degree with other school objectives. True, for a hundred years Germany has taught religion directly and with results satisfactory to its own people. France has done the same with morals, and the French government writes and publishes the textbooks, considering that the subject is too precious to admit of commercialization. The United

<sup>26</sup> From J. R. Jewell and R. C. Blackler, *Character Education*, A Manual for Oregon Teachers. Salem: State Printing Department, 1930, p. 9.

States has surpassed the remainder of the world in such fields as educational psychology, making skillful analyses of the learning process, of the factors involved in whatever of transfer of training there may be found to be, and in the development of accurate mental and achievement tests. But the consideration of character development has received only slight attention until very recently, and so has remained in the speculative field of uncertainty and disagreement.

This has been due, among other things, to the intangible and uncertain nature of the concept of character, to dissenting schools of thought in the fields of ethics and religion, and to the emphasis that has been given in this new civilization of ours to the social, civic, and economic aspects of the educative process. Hence, so far as our schools are concerned, whatever has been accomplished in the way of character education has come for the most part incidentally and indirectly, and largely through the influence and example of the teacher, with but few isolated attempts at character training through definitely organized procedures.

The effectiveness of this method of indirection seemed much more in evidence a generation ago than now. The last quarter century has seen a greater change than previous centuries, perhaps in specialization, due to the leaving behind of relative simplicity in living conditions. There are increasing numbers of young people upon whom the socializing and moralizing influences of the home and church are not now felt as they were, there is less of the lingering religious basis of education that came down to us from Pilgrim or Puritan ancestors, and the moral content of much of the material common to education, such as the McGuffey Readers, is no longer in evidence.

Without assuming the attitude of the pessimist, and so lamenting the decline from the moral and social stands of the previous age, and seeing in these changed conditions only sure signs of impending disaster and destruction, still we cannot be blind to the numerous factors of our environment which have multiplied the number and increased the complexity of the problems to be faced and solved by the boys and girls now growing up. The advent of the movie, radio, automobile, the amount of leisure time never before known, the absence of the possibility of "home chores" to a large share of our children, unstable home life, changing attitude toward religious authority, the prevalence of juvenile delinquency and crime, and the waning belief in the objectivity of social standards of morals—all these are but examples of the innumerable details composing the intricate maze through which the mind of the inexperienced youth must find its way.

## 5. REWARDS AS FACTORS IN CHARACTER EDUCATION <sup>27</sup>

### *Massachusetts Department of Education*

Rewards as a means of character development and training in the responsibilities of citizenship offer a problem equally as perplexing as the matter

<sup>27</sup> From Report on *Character Education in the Secondary Schools*, The Commonwealth of Massachusetts Department of Education, State House, Boston, Massachusetts, 1931, No. 16, pp.

of proper discipline. In the lower grades rewards are a very effective means of securing results and consequent development. As pupils advance and especially when they reach the secondary school grades, the value of rewards as agents of development decrease noticeably, and their proper use becomes more and more difficult. Most educators will agree that no rewards of any nature should be given for the average accomplishment of work that is supposed to be done as part of one's regular assignments from day to day. There is no doubt that the free distribution of rewards for average accomplishments gives the recipient the impression that he should be rewarded for everything he does. Such unrestricted use certainly retards rather than promotes character development. Rewards, regardless of their nature, should be retained for superior achievements, as otherwise their values become lowered to the point where incentive for possession is lost, and they fail to function as instruments of worth in our educational program. Investigations have shown that many types of rewards have desirable effects on most pupils, not only increasing their efforts but improving their general attitudes toward school life. Any rewards that are offered should be on such basis that there will be absolute justice to all, and it may also be stated that they should be open to all pupils and not be reserved for any special or privileged group.

As a general statement, although rewards do have their place in our educational plans, nevertheless unless greatly restricted so that real merit is required to win them, their usefulness in character building is negligible, and even harmful as before stated. Honor rolls which include 50 per cent of a student body are not real recognitions of accomplishments, because the distinctions are won too easily. Great care must be exercised in establishing the requirements for such honors, in order that the proper number of pupils may be included. Such requirements should neither be too high, nor too low. This applies to all types of rewards such as graduation honors, honor rolls, class leadership, honor societies, service leadership, character rewards, team leadership, and the many other types of rewards which are in evidence in most of our schools. They all have values in themselves as incentives, such as means of emphasizing the thrill of satisfaction which comes because of tasks well done. These values are lost when the rewards can be secured too easily or are ends in themselves rather than testimonials of superior achievement and incentives for even greater accomplishments and development.

Character development results more from the satisfaction which any successful pupil may be led to feel because of his superior achievements than from any material reward which he may receive for his success. Rewards in school should be placed on the same basis as rewards which are given in life, not for ordinary work and effort which is expected and demanded of any man, but rather for occasional superior demonstrations of worth, and especially for interest in the welfare of the group.

6. DISCIPLINE AS A FACTOR IN CHARACTER EDUCATION<sup>28</sup>*Esther L. Richards*

It is probably more than coincidence that at this period in our history when governmental commissions report increasing lawlessness and students of social science agree that youth is in revolt, the attention of parent education and its allied organizations should turn toward discussions of discipline. In his address before the American Prison Association, Mr. Wickersham is quoted as saying "Very slowly we are coming to realize that something more than legislative fiat is necessary to make good citizens; that all the threatened punishments legislative imagination can devise will not compel rebellious human nature to abide by rules of conduct that run counter to their wishes, their tastes, their needs, or their prejudices. Something more is necessary." The "something more" he indicated must be sought in a more general realization of an old proverb—"It is more important to form good habits than to frame good laws." Simultaneous with this pronouncement from Mr. Hoover's Law Enforcement Commission came a similar statement from the New York Crime Commission with some frank conclusions:

- (1) "That no unit causes of crime are discoverable."
- (2) "That repeated imprisonments are not deterrents."
- (3) "That youth is in revolt."
- (4) "That the disintegration of family life contributes to crime."

These reflections are not tourist impressions of cut and dried investigators annually accustomed to signing their names to generalizations. They represent a detailed, scientific study of the offender and his family background of constitutional endowment and environmental influences of home and school and neighborhood and occupational relationships. The individuals and organizations sponsoring these reports leave no doubt as to the genuineness of their contribution. Accordingly when these authorities localize the troubles within the family and neighborhood and social set and not in economic factors of unemployment, liquor traffic, weakness of law enforcement mechanisms, etc., the arraignment is serious. The findings of these commissions are not news items to students of behavior in the fields of psychology and psychiatry, education, social science. We have been working for years in almost night and day shifts trying to find out why some people get along easily in life, [why] others have a very hard time in doing so, and [why] still others, in spite of all sorts of special help, never seem able to make a go of it and from the cradle to the grave are always in trouble.

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<sup>28</sup> From Esther L. Richards, "Discipline and Adjustment," *Education*, 54, 1934, p. 403.



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## EXERCISES

1. What is the psychological nature of character? What are the advantages to the teacher in conceiving character as conduct? Wherein is this conception inadequate?
2. To what extent, if at all, is individualism in our social order incompatible with the conception of character set forth in this chapter?
3. Make a contrast of the views of character that are held by Freeman and Kilpatrick. Is there any essential difference in their views?
4. Just what needs exist for a dynamic character education program in a democracy?
5. Does religious training include in its program the development of character? If so, is religious training and character training the same thing? If these terms are not identical, wherein do they differ? To what extent, if at all, must any adequate program and theory of character development take into consideration the individual's faith, worship, and philosophy of life?
6. What responsibility has the school in the matter of character development?
7. Assume that your school principal or superintendent has asked you to suggest to him and your fellow teachers a program for character development. Report here in detail the program that you should like to see inaugurated. What is the aim of the proposed program? Is it something to be added to the work of the school as now set up, or are all the school subjects—curricular and extra-curricular—and all activities to be utilized for the promotion of the best possible kind of growth, including character?

8. Prepare a unit assignment in one of the subjects in which you as a teacher definitely purpose and plan to develop in your pupils outcomes (conducts, wants, values, etc.) that are the very essence of character.

9. If training the child to do the best thing in each situation that confronts him is the aim of character education, what place has each of the following: creative experience, group participation, deliberation and choice, and (automatic) habits?

10. What are the relative merits of the direct and the indirect methods of character formation?

11. What influence on character is exerted by social institutions outside of the school and home? How can these institutions be induced to co-operate with the home and school in the program of character development? What are some of the difficulties that confront teachers and civic-minded citizens in this work? How can these difficulties be overcome?

## CHAPTER XII

### CREATIVE ACTIVITY AND EXPRESSION<sup>1</sup>

*Coleman R. Griffith, University of Illinois*

#### I. Introduction

A major share of the arts of teaching and learning depend upon the facts and laws of learning, and this is quite proper, for we must all make a long passage from infancy to maturity which means that we must grow by learning how to do those things which our elders do. But much of our learning can be described as a taking or a getting and it is the purpose of this chapter to show that we shall also be asked to give or to create. About the processes of taking or getting we know a great deal for learning has lent itself readily to experimental study so that we can be taught how to learn swiftly and how to use our skills and habits with wisdom; but our creating, even though we have enough instances of it in the arts, in thinking, and in invention, has not been made the subject of intense study. We must, then, in this chapter, state a problem rather than list a number facts which will solve the problem.

There is a word which, in its daily use on the athletic field, in the classroom and even in the laboratory, quite expresses the creative factor in conduct and experience. This word is the "hunch." Two scientific men have defined this word as follows:

A scientific hunch is a unifying or clarifying idea which springs into consciousness suddenly as a solution to a problem in which we are intensely interested. In typical cases, it follows a long study but comes into consciousness at a time when we are not consciously working on the problem. A hunch springs from a wide knowledge of facts but is essentially a leap of the imagination, in that it goes beyond a mere necessary conclusion which any reasonable man must draw from the data at hand. It is a process of creative thought.\*

#### II. The Nature of the Problem<sup>2</sup>

*J. M. Fletcher*

The sterility of our teaching is thought by many to be finding expression in the spirit of our age, an age repeatedly accused of being impelled by the zeal for *having* rather than for *giving*; for *possessing* rather than for *creating*;

<sup>1</sup> The selections in this chapter illuminate growth through expression and creative experience. They supplement excellent discussions found in the following: Skinner and Collaborators, *Educational Psychology*, Chapter VI, by Dr. J. M. Fletcher; Skinner and Collaborators, *Readings in Psychology*, Chapters XIX and XX; Fletcher, *Psychology in Education*, Chapters III, X, XI, and XIII; and Hollingworth, *Educational Psychology*, Chapter XVI. Owing to the fact that this topic is so often omitted from many of our textbooks, these excerpts may be read with great profit by students using such texts.

\* From W. Platt and R. A. Baker, "The Relation of the Scientific 'Hunch' to Research." *Journal of Chemical Education*, 8, 1931, p. 1975.

<sup>2</sup> From J. M. Fletcher, *Psychology in Education*. Garden City: Doubleday, Doran and Company, Inc., 1934, pp. 302-306.

for *achievement* rather than for *experience*. Ours is an age that has sacrificed the *art* of living in its pursuit of the *means* of living. Hence the mental and the social sciences are lagging generations behind the physical sciences. The suggestion was made only a while ago to the British Association for the Advancement of Science that invention cease for a period of years so as to enable the spirit of man to catch up and make for itself a place in the world transformed by the physical sciences. Since such a moratorium can neither be declared nor enforced, the alternative must be to lay increased emphasis in education upon those aspects of mental life which will best help to relieve the disturbance of balance, from which our civilization seems to be suffering.

That we are creatively poor in spite of our material wealth we are not allowed these days to forget. With all of the superlative accomplishments of our industrialism, we have nothing in creative art that can excel what the Greeks have left behind. We still ponder over the precious fragments of literature found in the ruins of their buried cities. The thrill that went around the world when the Hermes of Praxiteles was dug up from the ruins of ancient Olympia was impressive and at the same time full of significance to education. "America," says Henry Fairfield Osborn, "is rich in a material way, far beyond the dreams of Croesus, but we are still impoverished in creative intelligence and in spiritual life." Havelock Ellis says that "so far as the production of high original genius is concerned, an old Italian city, like Florence, with a few thousand inhabitants, had far more to show than all the United States put together."

Economically we have, as Professor Tawney points out, developed an acquisitive society, in which the chief aim is to accumulate profits. Paralleling this (or shall we say one causes the other?) we have developed an acquisitive education, with its underlying science of the learning process. The aim of instruction has been to store the contents of our curricula in the minds of pupils. As in economic life, so in intellectual life absorption cannot afford a satisfactory objective. Merely to have goods in the one case or information in the other will not guarantee a worthy existence. Any new body of knowledge which we may call upon pupils to take into their minds must, to be educative, become a living part of the intellectual equipment of these pupils, must contribute something toward a new orientation toward cultural and practical values. Despite our indiscriminating acceptance of learning of all sorts as being unmixed good, any body of knowledge may, when it fails to function advantageously in the life economy of a human being, turn out to be mere intellectual rubbish.

The spirit of commercialism, of gain, of profits for the sake of profits, seems to be ultimately self-destructive in economic relations. That its educational analogue of intellectual engorgement for the sake of being filled is pedagogically self-destructive seems to be also a recent discovery. On this point Rugg and Shumaker \* write as follows:

\* From Rugg & Shumaker's *The Child-Centered School*, p. 144. Reprinted by permission of World Book Company.

Under the impulse of the current educational revolution . . . assimilation is coming to be regarded as the central element in effective learning. The individual grows only as he actively builds into his previous experience new reconstructions of meanings, feelings, perspectives, skills, and what not. Hence, in our day we are recognizing that the process of creating the new is not only basic to the development of individuality; it is a very important element in the growth of understanding.

At this time when the human mind is exposed to such a variety of stimulations, it is not so much through lack of experience as through lack of some wholesome form of life expression that mental frustration ensues. In speaking of the American mind as depicted by Sherwood Anderson, Whipple† says:

Anderson affords a key to the understanding of this country in his sentence, "The living force within could not find expression." The people are baffled because their lives offer no channel through which their vitality can discharge itself. That is why they are all, as he himself more than once pointed out, grotesque, misshapen, deformed by their own bottled-up energy. They are uncomprehending because their world offers them nothing to comprehend; their existence is an interminable reiteration of meaningless detail, and the innate incapacity of man to be a vegetable makes the tragedy. This is the land, not of repressed, but of unfulfilled desires. Nor, although sex plays an enormous role in this country, is it true that these desires are exclusively sexual. The drama is not chiefly the struggle of sex with convention or with inhibitions of any sort. It is something vastly wider; it is the rebellion of all desire against the inanity of life. Like all other men and women, Anderson's are fired with longings, dreams, ideals, aspirations—but these they cannot even formulate, much less effectuate. Desire, in this land, instead of being a creative force, is destructive, devastating, thwarted and made futile by the lack of any means of realization, by the pointlessness of life.

Accepting such a characterization of the American mind as being even partially valid, one feels warranted in drawing from it two inferences: first, that what the mind of a people is must be counted the chief responsibility of the educational system in operation among them; and second, that there is a lack of emphasis on the expressive processes of mental life necessary to counteract the distortions of which Anderson gives us such pictures. The very processes of instructing, examining, reciting, etc., instead of facilitating independent thinking, are calculated to induce inhibitions, which may accumulate through the years into feelings of intellectual defeat and futility. Among students as among others it is not that there is undue repression; rather is there lack of proper modes of expression. This pedagogical situation doubtless accounts for the fact that such a large percentage of the creative minds of the past have not been pliantly submissive to educational regimentation. Really, what would happen to a mind if all who teach it were to have their way with it?

† *The Spokesman*. New York: D. Appleton-Century Company, pp. 117 f.

So completely have we been absorbed in "putting the curriculum across," that ready and vigorous connections have not been made between impression and expression. Like religious evangelists we hope to save the world by dispensing knowledge. In the pursuance of this hope we have worked out "laws of learning," or mental intake, by heroically painstaking experimentation. We have sought to determine the proper length of study periods, the proper utilization of the time within those periods. We have worked out the relative values of study and recitation in the process of mental acquisition. The very furniture of our schoolroom betrays to Dewey's mind a conception of education in terms of listening. The minds of the pupils behind these listening stations called desks, like the inkwells on top of them, are there to be filled.

The laws of association, of conditioning, of habit formation, of transfer of training, all have had a generous share of painstaking and altogether valuable study by the pioneers in the field of educational psychology. No such labor has been expended toward understanding the expressive or creative side of the educative process. This neglect is serious, not only because it is bound ultimately to affect the source of supply of the products of the intellectual life that constitute the basis of civilization, but because the mind of man is so constituted that intellectual acquisition or intake cannot be regarded as a separate compartment of living capable of being developed in isolation from all the rest. The mind is not like a purse that can be filled with valuable stuff, the use of which, when and if the need of it arises in the future, can best be left to the possessor. The old adage that we learn best by doing has a psychological basis; as it has been well said before, there can be no adequate assimilation without use.

### III. Examples of Creative Insight<sup>3</sup>

W. Platt and R. A. Baker

A clearer understanding of what Wallas has called the periods of incubation and illumination, which latter we have designated the scientific hunch, may be gained through several typical examples.

H. Poincaré in an article on invention in mathematics remarks that the most striking feature of mathematical invention is "apparent sudden illumination." Of one of the greatest of his discoveries, the *fonctions fuchsienues*, he wrote: "I had been endeavoring for two weeks to demonstrate that there could exist no function analogous to those I have since called *fonctions fuchsienues*. Each day I spent an hour or two at my working table . . . but I came to no solution. One evening, against my habit, I drank some black coffee. I could not sleep; ideas crowded my mind; I felt them knocking against each other, until two of them hung together, as it were, and formed a stable combination. In the morning, I had established the existence of a class of functions. There remained merely to set down the results and that was done in a few hours."

<sup>3</sup> From W. Platt and R. A. Baker, "The Relation of the Scientific 'Hunch' to Research." *Journal of Chemical Education*, 8, 1931, pp. 1973-1975.

Prince Kropotkin had for several years been intensely interested in the physical conformation of Asia. He writes in his memoirs that he had "marked on a large-scale map all geological and physical observations that had been made by different travelers and that he had tried to find out what structural lines would answer best the observed realities." This preparatory work required over two years.

"Then following months of intense thought in order to find out what the bewildering chaos of scattered observations meant until one day all of a sudden the whole became as clear and comprehensive as if it were illuminated with a flash of light. . . . There are not many joys in human life equal to the joy of the sudden birth of a generalization illuminating the mind after a long period of patient research."

Von Helmholtz, the great German physicist, speaking on his seventieth birthday, described the way in which his most important new thoughts had come to him. He said that after previous investigation of a problem "in all directions . . . happy ideas come unexpectedly without effort like an inspiration. So far as I am concerned they have never come to me when my mind was fatigued or when I was at my working table." Helmholtz found that rest was necessary for the appearance of scientific inspiration and that brilliant ideas often occurred to him in the morning after a night's rest.

They came particularly readily during the slow ascent of wooded hills on a sunny day.

For years, through intense and unremitting observation, Darwin had been accumulating masses of facts which pointed to a momentous conclusion. But they pointed through a maze of baffling inconsistencies. Then suddenly the flash of vision came! "I can remember," he tells us in that precious fragment of an autobiography, "I can remember the very spot in the road, whilst in my carriage, when to my joy, the solution occurred to me," and then and only then, with the infinite toil of exposition, was slowly framed from the obdurate facts the great statement of the theory of evolution. (Lowes)

A more general description of the hunch is given in the following report by Platt of the Symposium on Industrial Research:

The question of "chemical hunches" came in for much discussion, even though not directly connected with the symposium. Every worker with a spark of the true scientist in him has had the experience of the appearance of the hunch. He has been working on a problem continuously without success. He may even abandon the problem for a time. Suddenly the solution comes to him. He thinks it over and it seems eminently reasonable from every point of view. He tries it and it works! Out of an almost infinite number of possible modes of attack, the right one has dawned upon him without effort—seemingly from Heaven!

Many of those present believed that it was possible definitely to encourage the appearance of the hunch by purposely creating favorable conditions. In general, a man incessantly busy with one activity or another during all his waking moments is not one to whom such ideas often come. We can drown out messages

from the subconscious mind by keeping our conscious mind constantly occupied or too greatly fatigued.

Great differences were reported as to the most favorable conditions for the appearance of the hunch. L. H. Cone advised work in the laboratory. The hunch would come while the work was in progress. Another chemist said that the most valuable time that he ever put in for his employer was spent sitting with his feet on the window sill looking out of the window.

Most reported that hunches came during periods of apparent idleness—following, however, long periods of intensive work. One reported the system of going over the problem just before retiring for the night. The solution would often become apparent in the morning. . . . This is a question which is worthy of further study both from the psychological and the chemical points of view.

#### IV. The Role of Insight in Plane Geometry <sup>4</sup>

*L. K. Henry*

The purpose of the experiment herein reported was to test the hypothesis that the mental behavior observed in solving originals in geometry under controlled conditions could be adequately and correctly described as the operation of "insight."

In order to test this hypothesis it was necessary to do three things:

(1) Determine, in so far as possible, adequate and satisfactory criteria of insight.

(2) Set up a controlled situation in geometry which offered opportunity for the characteristics of insight to appear.

(3) Observe whether or not the characteristics of insight appeared universally, frequently, rarely, or not at all.

The concept and use of the term "insight" in this study were based on the following considerations:

(1) Insight, as a psychological term, is by no means new, having been defined by Baldwin in 1901 as the "apprehension of the more subtle and profound aspects of truth in a relatively immediate and direct way."

(2) Insight has a place as a technical term outside the configurational school and is assigned such meanings as "the knowledge of significant relations and hidden resemblances"; "seeing into" or "understanding the situation"; "immediate process of apprehension."

(3) Insight in the Gestalt literature is defined as "the appearance of a complete solution with reference to the whole lay-out of the field"; "to understand or see into"; "an organized response at the level of conscious behavior."

(4) The matter of insight in human subjects has been little investigated and is not well understood. Three studies in particular, those of Alpert, Bulbrook and Dunkelberger, and Rumberger were patterned after Köhler's with the apes. Alpert found insight to be present if the solution was reached, but he qualified the phenomenon as being sometimes partial and also as some-

<sup>4</sup> Adapted from L. K. Henry, "The Role of Insight in Plane Geometry." *Journal of Educational Psychology*, 25, 1934, pp. 598-609.



times gradual. In the other two investigations cited the writers did not find that the behavior could be adequately or properly described as the operation of insight. Maier in studying concrete problem-solving behavior of humans (as well as of rats) found insight to appear in characteristic fashion and concluded that the behavior could not be accounted for by the principles of association and trial and error.

(5) Lists of criteria of insight by Yerkes, Bingham, Wheeler, and Alpert rather generally establish as characteristics of insight the transposition and application of principles in a novel situation, a type of behavior which takes into account natural interrelations in the situations and definite changes in the way the subject feels about the situation.

In view of these considerations, insight, as used in this study, would involve the correct application, in a sudden and confident manner, of a principle in a problem situation.

The experimental materials selected were fourteen theorems in straight line figures in plane geometry and nine geometric originals which required the application of these theorems for their solutions.

These stimulus cards were presented through an exposure screen to the thirty-two tenth-grade students who were taking second-semester geometry at the University of Iowa Experimental School. The following instructions were read by the subject:

"Through the opening in the screen you will see a series of cards presented one at a time. On each card you will see a statement or a figure representing a situation in geometry to which you are to react orally. No writing is necessary.

"You are asked to tell what comes to your mind, and to speak freely in response to certain questions. The questions to which you are to react are written on a separate card and will be given you before the start of the series of cards.

"Some of the situations may be presented several times in a different way in order to get the relation between what is given and your response. In every case you are to respond with reference to the questions on a separate card. You will be informed when you have stated the thing to be proved, and again when you have stated the proof. Some of the material will no doubt be too easy for you and some may be too hard. These facts are valuable to me in each case so please do your best at all times to tell what is in your mind. Feel free to volunteer any information that does not seem to be covered by the questions."

Were insight a common experience, one would expect the following occurrences with reasonable frequency in this experiment:

(1) The correct transposition and application of known theorems in simple originals which involve the known principles.

(2) Evidence of a relation in the subject's thinking between factors which are logically and geometrically related.

(3) A suddenness of perception and realization of facts and relationships of the solution accompanied by a change in the tempo and expression of the verbalizing behavior.

(4) A feeling of surety and confidence in the correctness of the solution.

The following conclusions were reached:

(1) With the correct application of known theorems to the solution of simple originals as a criterion, insight may be said to have operated in 32 per cent of the cases. By the use of hints the value was raised to 58 per cent of the cases, representing the total number of solutions achieved by the subjects. The ability to note the relationships present, that is, to state the fact to be proved in an original, operated in 50 per cent of the cases. This value was stepped up to 90 per cent by hints from the experimenter.

(2) The following criteria of insight failed to receive a significant amount of supporting evidence:

(a) The indication of a relation in the subject's thinking between factors that were logically and geometrically related. The ability to respond to common factors in situations was not consistent from situation to situation.

(b) The suddenness of appearance of the solution. The "Oh! I see" experience occurred but seventeen times in two hundred eighty-five problem situations and in only three cases was the solution the object of the occurrence.

(c) The feeling of surety and confidence in the correctness of the solution. At the termination of a series of statements by the subjects, they were frequently asked whether or not they had completed the proof or why a certain thing was true. Their answers in most cases revealed a lack of surety and often a tendency to change a reason for statement previously made.

(3) The values of the data on the transfer of theorems as a criterion of insight is jeopardized by the fact that the same theorems were used incorrectly almost as often as correctly.

(4) The large number of errors due to failure to take into account the characteristics of the situation suggests a general lack of insightful behavior.

In view of these considerations the writer holds that while insight occurred in the solution of originals, it was not the robust, universal trait that characterized the rational solution of problems and was, therefore, inadequate and unsuited to describe the typical behavior in this experiment. In a strictly scientific sense the writer's characterizations of problem behavior are of necessity limited to the conditions of this study. However, the nature of the experimental conditions seems to insure a fair answer to the question relative to the presence or absence of insight in the solution of geometric originals. If insight fails to occur consistently under conditions which technically facilitate its occurrence (superior geometrical ability and experience, favorable training, direction of subject's attention to interrelations through instructions and manipulation of the stimulus pattern), it seems fair to suspect that it would not occur under mediocre or poor educational conditions.

## V. Musical Creation <sup>5</sup>

*Henry Cowell*

As a child I was compelled to make my mind into a musical instrument because between the ages of eight and fourteen years I had no other, yet de-

<sup>5</sup> From Henry Cowell, "The Process of Musical Creation." *The American Journal of Psychology*, 37, 1926, pp. 235-236.

sired strongly to hear music frequently. I could not attend enough concerts to satisfy the craving for music, so I formed the habit, when I did attend them, of deliberately rehearsing the compositions I heard and liked, in order that I might play them over mentally whenever I chose. At first the rehearsal was very imperfect. I could only hear the melody and a mere snatch of the harmony, and had to make great effort to hear the right tone quality. I would try, for instance, to hear a violin tone, but unless I worked hard to keep a grip on it, it would shade off into something indeterminate.

No sooner did I begin this self-training than I had at times curious experiences of having glorious sounds leap unexpectedly into my mind—original melodies and complete harmonies such as I could not conjure forth at will, and exalted qualities of tone such as I had never heard nor before imagined. I had at first not the slightest control over what was being played in my mind at these times; I could not bring the music about at will, nor could I capture the material sufficiently to write it down. Perhaps these experiences constituted what is known as an “inspiration.”

I believe, had I let well enough alone and remained passive, that the state of being subject to these occasional musical visitations would have remained, and that I would now be one of those who have to “wait for an inspiration.” But I was intensely curious concerning the experiences and strove constantly to gain some sort of control over them, and finally found that by an almost superhuman effort I could bring one of them about. I practiced doing this until I became able to produce them with ease. It was not until then that I began to develop some slight control over the musical materials. At first able to control only a note or two during a musical flow lasting perhaps half an hour, I became able, by constant attempt, to produce more and more readily whatever melodies and harmonies and tone qualities I desired, without altering the nature of the flow of sounds. I practiced directing the flow into the channels of the sounds of a few instruments at a time, until I could conjure their sounds perfectly at will.

As soon as I could control which sounds I should hear, and turn on a flow of them at will, I was able, by virtue of studying notation, to write down the thought, after going over it until it was thoroughly memorized. I have never tried to put down an idea until I have rehearsed it mentally so many times that it is impossible to forget the second part while writing down the first.

I shall never forget the disappointment I experienced when I first wrote down a composition and played it. Could it be that this rather uninteresting collection of sounds was the same as the theme that sounded so glorious in my mind? I rehearsed it all carefully; yes, it was the same harmony and melody, but most of the indescribable flowing richness had been lost by the imperfect playing of it on the imperfect instrument which all instruments are. Since then I have become resigned to the fact that no player can play as perfectly as the composer's mind; that no other instrument is so rich and beautiful, and

that only about ten per cent of the musical idea can be realized even at the best performance.

I am able now to produce a flow of musical sounds at will, and to control just what they shall be. I am therefore able to work at any time, as the musical flow would continue indefinitely if I did not shut it off when I have not the time to work. The flow does not merely ramble on ambiguously, but centers about a germinal theme, which it proceeds to enlarge upon. I usually compose around a theme for several months before it develops into its final form as written. Because of devoting so much attention to finding the finest form beforehand, by trying the initial idea over mentally in every conceivable way, I rarely change a note after a composition is written.

Writing in form, I may add, is not a matter of pushing certain sounds into an unyielding mold; crudities of form tend to drop out unconsciously as further experience is gained. The experience of being in the throes of musical creation is distinctly an emotional one; there is a mere semblance of the intellectual in being able to steer and govern the meteors of sound that leap through the mind like volcanic fire, in a glory and fullness unimaginable except by those who have heard them.

The closest observation on my part has failed to reveal what the exact relationship is, if there be one, between my musical creations and the experiences which have preceded it, either immediately or remotely. I can only say that the musical ideas as they run through my mind seem to be an exact mirror of my emotions of the moment, or of moments which I recall through memory.

## VI. The Role of Imagery<sup>6</sup>

Marie Agnew

The chief characteristic of Tschaikowsky's imagery was its marked spontaneity. His musical themes came to him not only voluntarily, but forcefully, with a compelling power. They welled up from within with inconceivable force and rapidity, throwing him into a condition which he called *somnambulistic*, in which "the soul throbs with an incomprehensible and indescribable excitement so that almost before we can follow this swift flight of inspiration, time passes literally unreckoned and unobserved."

Tschaikowsky's imagery had had the same compelling quality when he was a child. At four, his governess once found him crying long after the other children had gone to sleep. There was no music going on at the time, but when she asked him what was the matter, he replied, "Oh, this music, this music! Save me from it! It is here, here," pointing to his head, "and will not give me any peace." His brother says that, very early, "musical sounds according to his own account, followed him everywhere, whatever he was doing."

Fullness and exuberance also characterized Tschaikowsky's imagery. The melodies of his compositions never came to him singly, but in complete

<sup>6</sup> From Marie Agnew, "The Auditory Imagery of Great Composers." *Psychological Monographs*, 31, 1922, pp. 285-286.

form, fully harmonized. The basis of his vivid, profuse imagery was a keen sensitivity. He was deeply affected by nature, and responded to it much as did Wordsworth.

In regard to the function of Tchaikowsky's auditory imagery his brother says that "whenever Tchaikowsky wrote a symphonic work, he already heard it in imagination as it would sound in the concert room at Moscow." Tchaikowsky himself describes minutely his method of composing, showing the part played by the auditory image. In particular, he notes the effect of distraction—how sounds intruded on his mental music, and broke off the thread of his inspiration.

It would be vain to try to put into words that immeasurable sense of bliss that comes over me directly a new idea awakens in me and begins to assume definite form. I forget everything and behave like a madman. Everything within me starts pulsing and quivering; hardly have I begun the sketch ere one thought follows another. In the midst of this magic process it frequently happens that some external interruption wakes me from my somnambulist state: a ring at the bell, the entrance of my servant, the striking of the clock, reminding me that it is time to leave off. Dreadful, indeed, are such interruptions. Sometimes they break the thread of inspiration for a considerable time, so that I have to seek it again.

You ask me how I manage my instrumentation. I never compose in the *abstract*; that is to say, the musical thought never appears otherwise than in a suitable external form. In this way, I invent the musical idea and the instrumentation simultaneously. Thus I thought out the scherzo of our symphony—at the moment of its composition, exactly as you heard it. It is inconceivable except as a *pizzicato*. Were it played with a bow, it would lose all its charm and be a mere body without a soul.

I usually write my sketches on the first piece of paper to hand. I jot them down in the most abbreviated form. A melody never stands alone, but invariably with the harmonies which belong to it. These two elements of music, together with the rhythm, must never be separated; every melodic idea brings its own inevitable harmony and suitable rhythm.

Began the fifth scene, and in imagination I finished it yesterday, but in reality only got through it early today.

Yesterday, on the road from Voroshba to Kiev, music came singing and echoing through my head. . . . A theme in embryo, in B major, took possession of my mind, and almost led me on to attempt a symphony.

During my journey, while composing it (a symphony) in my mind, I frequently shed tears. Now I am home again, I have settled down to sketch out the work, and it goes with such ardor that in less than four days I have completed the first movement, while the rest of the Symphony is clearly outlined in my head.

All day long this duet has been running in my head, and under its influence I have written a song, the melody of which is very reminiscent of Massenet.

## VII. Tentative Explanations

I. ABSENCE OF CONFLICT<sup>7</sup>*James H. Leuba*

A subject practiced typewriting until he made, during the last ten-minute practices, the average score of 1508 words per period of ten minutes. After an interval of six months, he was tested ten times, ten minutes each time, under exactly the same conditions as those prevailing during the practice. The average score was 1433 and the number of errors was greater than during the last practice series. He refrained again from using the typewriter, this time, for a whole year. Thus, one year and a half had elapsed between the cessation of the practice and a second memory test. During this second test, the average score for ten ten-minute periods was 1611 words and the percentage of errors was less than during the first memory test. "There seems," says Book, "to have been an actual increase in skill during the rest interval of one year and a half. How is this to be explained? The increase in score shown by our second series was due, so far as we could make out, rather to the disappearance, with the lapse of time, of numerous interfering associations, bad habits of attention incidentally acquired in the course of learning, interfering habits and tendencies, which, as they faded, left the more firmly established typewriting associations free to act. Such hindering associations were developed in all stages of practice and at the 'critical stages' in great masses, forming a serious impediment to progress. After the rest of a year and a half these conflicting associations and hindering tendencies had noticeably disappeared." The six months which elapsed between the last practice and the first memory test were not sufficient, in the opinion of Book, to permit the disappearance of the hindering associations, hence the lowered score. "A year later, during the second memory test, the absence of difficulties and the greater ease had become so prominent as to attract the attention of the learner. The errors have slightly decreased and the score is better than ever before. We therefore conclude that it was the disappearance of the interfering associations and tendencies naturally developed in the course of learning which caused the increase in the score." \*

How one may pass from the above instance of improvement in typewriting to the explanation of scientific inspiration, it is easy to see. Thinking, as well as typewriting involves a neuromuscular mechanism. Our thoughts assume commonly a verbal form, even when they are not expressed in audible speech or in writing. The merely "mental" formulation of thought does not take place without incipient innervation of the speech and of other mechanisms.

<sup>7</sup> From James H. Leuba, "Freudian Psychology and Scientific Inspiration." *Psychological Review*, 31, 1924, pp. 189-191.

\*W. F. Book, "The Psychology of Skill: with Special Reference to its Acquisition in Typewriting," *University of Montana Publications in Psychology*, Bulletin No. 53, Psychology Series No. 1.

We may therefore say that thinking, like typewriting, involves false moves. As we repeat the unprofitable thinking, while exploring blind alleys, the production of the right thought becomes increasingly difficult. We all know that in certain circumstances it seems as if the mind had become limited to wrong directions; it goes round and round in the same vicious circles. If at such times we let go, thus producing a condition that will make possible a weakening or a disappearance of the unprofitable thought movements, and subsequently return to the problem, we stand a better chance of striking a new path, and the new path may be the right one.

## 2. PRESENCE OF CONFLICT<sup>8</sup>

*L. J. Bragman*

If the individual who is displeased with reality is in possession of that artistic talent which is still a psychological riddle, he can transform his fantasies into artistic creations. So he escapes the fate of a neurosis and wins back his connections by this roundabout way.—FREUD.

In a psychological study of Lewisohn as a creative artist it is apparent that he was never able to detach himself from his intimate problems. His personality was such that the direction of his literary career was practically inevitable and predetermined. Suffering grievously from an inferiority complex, afflicted as he felt by a cruel, cutting chain of racial memories with their various concomitants, he became an introvert, seeking the scholarly pursuits, studying but avoiding reality, becoming emotionally unstable, and apprehensive of a world intolerant and too much for him.

That a great trauma was inflicted on him as a result of racial hostility is obvious. That he tried to assimilate, to overcompromise, is his great tragedy. That his unsuccessful marriage became his single example for sweeping conclusions on the intermarriage issue is his gigantic error. That he turned to the faith of his fathers is his saving grace. As he in a moment of self-analysis put it: "Israel preserved me."

For his impassioned, overdetermined Jewish complex produced four types of achievement. In his many recognized successes in literature he finds the warmth of social satisfaction. That their content, and, as he is convinced, their impetus are essentially Jewish gives him a high degree of racial satisfaction. Physical comfort and happiness he finds in his companionship with a woman attuned to the Jewish mode of life. Spiritual peace and a lasting haven he discovers in Israel. Thus a neurotic constitution, sublimated, solves its otherwise devastating difficulties, and adds a measure of cultural adornment to civilization.

Lewisohn fled from reality, but found ease, at last; for he realized that "the psychical aches and inhibitions and discomforts of the Jews were all flights from an obscure reality—they substituted, they interposed the barriers

<sup>8</sup> From L. J. Bragman, "The Case of Ludwig Lewisohn. A Contribution to the Psychology of Creative Genius." *American Journal of Psychiatry*, **II**, 1931-32, pp. 330-331.

of phobias between themselves and reality; they were in perpetual flight." Did Israel represent for him a return to the maternal shelter; was he once more seeking the protection of his childhood home? He says:

Even Jews, who had wholly lost their traditions and their pride, evidently still had that instinctive feeling for their parents as mothers and elders in Israel. No human being ever got over the shock of birth, and all our seeking of human or physical shelter is an obscure urge back to the security of the womb.

Struggling against tremendous odds Upstream, painfully gaining Mid-Channel, with a valiant effort at last he reaches his harbor, Israel. This is the Odyssey of Ludwig Lewisohn. So, fed by sources deep within his subconsciousness, he escapes the fate of a neurosis through the expressive medium of his creative genius.

### VIII. Research in Creative Effort <sup>9</sup>

E. D. Hutchinson

Success in research on the problems of creative thinking will lie, it seems, in the following directions.

First, in comparative studies of the various types of creative thinkers with a view to determining the uniformities that may exist. These will probably be greater than one expects. If a recent questionnaire sent out by the Educational Department of the American Chemical Society (not yet published) is any criterion, scientists are more like artists in their insights, "hunches" and flashes of genius, than popular opinion would suppose. We need to know more about types, if there are any. We need to describe more carefully the range from the logical, deliberative, consciously progressive thinkers at one end of the scale, to the inspired, emotional, spontaneous, "lyric" thinkers at the other end. Creative thought can apparently originate at any level of consciousness. Only by close biographical and introspective work can distinctions be made in this field, or men located within this framework.

Second, we need to define the periods in the development of a creative work, the period of *incubation* with its ingathering of materials, its ill-defined, restless impulse to create, which gradually, through a series of thwarted attempts at production, becomes more intense and explicit; the period of *inspiration*, in which some happy accident, or unusual combination of ideas furnishes the direction and point of origin for more rewarding work. The flood of ideas, the emotionality, the key idea or thesis, the fleeting nature of conceptions, all these contribute a certain exhilaration to the "moment of inspiration." And then the period of *verification*, or *elaboration*, in which the outline of the proposed work already indicated in the moment of illumination, is laboriously completed and criticized. Here also are exercised all the special techniques, rules of procedure, and methods required by the art or science employed. We need to draw more sharply the outlines of these periods, and sketch in the background.

<sup>9</sup> From E. D. Hutchinson, "Materials for the Study of Creative Thinking." *Psychological Bulletin*, 28, 1931, pp. 402-404.



Third, success in research will come if we can study more completely, either in animals or in men, the mental processes involved in *insight*. Some creative thinkers set their problems firmly in consciousness by hard, systematic effort, and then turn freely to other matters. Sometime during the period of undirected thought and relaxation, usually in a moment of sudden distraction or diversion of interest by irrelevant events or ideas, the looked-for answer, the desired solution comes to them. From then on, elaboration takes place fluently. Secondary inspirations dealing with the details of the whole give rise to fresh releases of energy and new enthusiasms. Here, on this experience is one focus of the problem of constructive thought. It would seem that the period of free thinking that so often intervenes between the establishment of the problem in consciousness and the sudden appearance of its solution may be disintegrative as well as integrative, ending either in unproductive reverie and daydreaming, or in some new fetch of the imagination. What determines the result? Clearly the period of preparation that precedes the illumination, the effort to entrench the creative purpose. Creative ideas are at times dependent upon the whim of free, unhampered thought, and the accident of distraction. But they are always linked with a strong creative urge, a problem firmly set in mind. Biographical confirmation of the sort Lowes and Lowell have so carefully furnished would help greatly in clearing the ground around these problems. Analytic studies of the mystics, the poets, the researchers and inventors, as to the sources of their material, would add breadth to the psychological analyses that have already been made.

Fourth, evidence is needed on a number of special aspects of the creative experience. For example, the intellectual activities of the thinker during the period of incubation, the extent of voluntary control of ideas, the stimuli for the commencement of creative work, the criteria of selection of ideas, the characteristics of the moment of inspiration, and the conditions of its appearance.

Fifth, we should have more *experimental* evidence on the nature of the creative process. This is not altogether unavailable. It is possible to experiment with dissociated states of consciousness and thus to duplicate some of the experiences of normal creative thought. For instance, by posthypnotic suggestion periods of inspiration can be conditioned which are introspectively the equivalent of the normal thing. . . . It would be desirable to have experimental verification of the generalizations obtained through comparative biographical studies.

## IX. The Development of Artistic Appreciation <sup>10</sup>

Luella Cole

*Children's interests.*—Many types of art work enjoy an immense advantage over more academic subjects in that they require a child to be active.

<sup>10</sup> From Luella Cole, *Psychology of the Elementary School Subjects*. New York: Farrar & Rinehart, Inc., 1934, pp. 280-285.

Practically all children like to make marks with pencil, crayon, or chalk on paper, blackboards, or the sides of a house. All children like to play with clay or to construct things of wood, leather, string, paper or even a cake of soap. They like to color pictures with crayons or paint, and enjoy looking at pictures, if only for a short time. Most children are interested in looking at flowers, colored leaves, sunsets, or a rainbow. In other words, there are a number of spontaneous interests that can be utilized as starting points for practically every department of pure or applied art. Children are not, however, usually concerned with the quality of the product. They enjoy the feeling that they are doing something and that they are expressing their own ideas. Thus, a small child is quite satisfied with a few scrawly lines and uncertain patches of color, the ensemble being a picture of "a funny old man that lives in a cloud." The vast discrepancy between thought and execution troubles children not at all. There is probably no other subject in school, unless it is physical education, to which school children bring such an array of natural interests and spontaneous activity.

The effect of schooling upon children is all too often rather unfortunate. Many teachers persist in emphasizing the technical excellence of a production rather than the ideas and activities behind it. They likewise prefer more conventional subjects than some children wish to draw. In one study it was found that a group of twenty preschool children who were supplied with paper and crayons and left alone to draw or not as they chose produced a total of over one hundred drawings supposed to portray forty-five different topics; every child drew at least two pictures. A group of similar size made up of third-grade children produced in the same length of time only about sixty pictures on not more than a dozen topics, and only half of the children spontaneously drew anything. What drawing was done was technically far superior to anything produced by the earlier group. Nevertheless, the main effect of schooling had been to discourage drawing as a means of self-expression for half the children and to conventionalize the subjects chosen by the other half. One realizes that such results must be frequent when one considers the number of children who dislike art work in school but who spend hours outside of school voluntarily pursuing activities which involve artistic endeavor, even though of a rather elementary nature. Situations such as these are probably the results of instruction in which there is too much emphasis on technique, too much conformity to adult ideas of beauty, and too great a demand on abilities not yet adequately developed. Drawing, coloring, molding, and constructing can all be made into delightful means of relaxation, enjoyment, and self-expression, but not if childish activity is crushed by the imposition of adult standards in either performance or appreciation.

Children have their own ideas of beauty. They have definite standards in regard to colors, clothes, wallpaper, pictures or anything else. These preferences differ in kind from those of the adult. More has been done in investigating preferences in colors and pictures than in other fields, but the main points are perhaps applicable elsewhere. Children prefer saturated primary

colors to either tints or shades; this preference shows itself in many ways. The little girl selects brilliant colors for her hair ribbons and the small boy desires colors of equal intensity in his neckties. Either prefers a red rose to a white one or a gaudy tulip to a lavender-hued aster. Even after children have been taught how to mix paints to obtain less brilliant colors, they will rarely do so voluntarily. In pictures, children want action and a story. The crudely colored comic strip in the Sunday paper supplies them with precisely what they want. A misty Corot landscape, a quiet Dutch interior, or a Gainsborough portrait makes practically no appeal; the colors are too subdued, there is no motion and no apparent story. The emotional quality in Millet's "Angelus" altogether escapes their attention; the children see only two people standing quietly in a field. Admittedly, the comic strip is not art, but the children are not to blame if the newspaper supplies them with pictures they can understand while the school does not. In order to begin the development of appreciation one must start with something the child is capable of appreciating. In all subjects teachers are in too much of a hurry. Instead of giving a child with a mentality of eight such pictures, stories, or arithmetic problems as can be grasped and enjoyed, the school persists in trying to develop adult understanding at once. The eight-year-old mentality does not know what is wrong, but it does develop a deep-seated aversion to that which it cannot grasp. There is no surer way of checking growth in appreciation than to insist upon an emotional response to the Sistine Madonna at a time when the children are thrilled by Parrish's "Pirate Ship." Children experience the emotional reactions that go with true appreciation, but these feelings are aroused by stimuli different from those which appeal to adults.

*Training for taste and appreciation.*—Since relatively few children have technical skill or display much interest in accurate execution, it becomes clear that appreciation and a development of good taste are the main objectives of general education in art. For developing appreciation there should be a wealth of stimuli of all sorts, from masterpieces of painting and sculpture to expert leather bindings and fine china. Examination of museum exhibits is highly recommended. Before a lesson in appreciation or a visit to a museum the teacher should prepare the children for what they will see. Particular elements to look for may be stressed, providing the analysis involved is not so prominent as to interfere with the total effect. In no case should the preparation involve merely a presentation of facts, because appreciation is not intellectual in character and an emphasis on facts gives children the idea that knowing is more important than feeling. The preparation should be followed by a leisurely examination of the material in question. Finally, the children should be given the opportunity freely to discuss their thoughts and feelings. In any average group there are some children whose reactions may be used as starting points for helping the pupils to see and feel more, but care must be taken to keep such discussion within the experiences of the children. It is an interesting assignment to ask children to find something beautiful to look at in their own

homes, school, or neighborhood, thus developing the habit of seeing beauty in commonplace surroundings.

The development of good taste may be approached through the use of pictures, clothes, books, valentines, May baskets, gifts, house furnishings, or almost anything else. If the co-operation of local merchants can be gained, actual exhibits of hats, dresses, neckties, shoes, books, wallpaper, kitchen utensils, and other articles can be arranged and the children asked to select what is appropriate for this or that purpose. Such assignments as the following are useful: "Suppose you wanted an ornament for the mantelpiece in this room (showing a picture), what would you select?" In formulating their answers, the children should first study the picture and then look in store windows, or at ornaments in each other's houses, or even at pictures in a catalogue. At other times they may be given a collection of twenty-five or thirty pictures and asked which three they would select to hang in the room of a boy (or girl) of some age less than their own. Before Christmas, when the question of gifts arises, excellent exercises on the selection of artistic presents may be devised. A consideration of Christmas cards, Easter cards, or valentines may lead to the development of a better selection than would otherwise be likely. There is no dearth of material for the development of taste; the main danger lies in the use of material unsuited to the discriminatory abilities of children.

*Technique and enjoyment.*—Although the main objective of work in elementary school should be a fullness of appreciation of beauty in such forms as children can see, the enjoyment and relaxation incident to the creative side should not be neglected. In the previous section on music stress was laid on the unimportance of the quality of the sound a child makes; the main requirement is that he make his noises joyously. Similarly, the main consideration in drawing or modeling or painting is not the product but the exhilarating creative experience which produced it. The role of technique is here implied. Elements of technique should be introduced as the children become able to understand and execute them, but their use in spontaneous work should not be demanded. When some of the children want to know what they can do to keep their pictures from "going up hill" it is time to introduce some elements of perspective. Similarly, facts about color mixing should be postponed until the children want to paint grass that is not violently green or barns that are not a flaming red. Always, matters of technique should be introduced as solutions to drawing that *does not satisfy* the children; they should never be taught until the children are ready for them. Techniques occupy, then, a subordinate position as a means to an end. During the elementary school years an overdose of technical requirements leads, not to better drawing, but chiefly to nervous strain and fatigue, thus killing interest and bringing about exactly the condition that should be avoided at all costs.

In the early grades, use of a model should not be expected to inspire pictures resembling the model. A child looks at his model, derives some degree of suggestion from it, and then proceeds to draw "out of his head." Much of the time children require no model. If one is used it should not be an article

drawn from adult notions of culture—a vase, for instance. It is easier for the untrained adult to draw a picture of a vase than that of a little girl rolling a hoop, but the child executes the latter fully as well and much more willingly. Experienced artists find the family cat both a difficult and an uninteresting model, but the animal is a much better subject for children than a still-life group composed of a curtain, a plate, and a pair of books. Models should sometimes be used, but more for their suggestiveness to the imagination than for the purpose of obtaining a photographic likeness. Again it must be emphasized that children neither think nor see as adults do.

There remains for discussion the matter of the use of drawing in other subjects. In the geography class children draw and color maps; in the nature-study class they draw diagrams or objects; in the manual training or sewing classes they draw diagrams or patterns. There is every reason for using such material in the drawing class. The subject matter in art need not necessarily be "arty." It is more important for the average individual to be able to employ what skill in drawing he possesses to make a diagram, map, or pattern than to make a picture. As children grow older, they will be required to make drawings in science classes; these, too, may well be included in the work of the art period. These humbler uses of drawing should not be forgotten.

*Art for children.*—As in the case of all other subjects, the main objective of art must be preparation for the needs of adult life through the use of childish interests and activities. At the same time, as with music, work in the art class should serve as a means of self-expression and of enjoyable relaxation. The crafts developed should be such as may lead to a profitable and interesting use of leisure time later on. Naturally, these objectives are not to be attained by the end of the sixth grade, although the first steps, especially in appreciation and good taste, should have been taken by then. If a school can make a beginning in these matters and can maintain the spirit of happy activity which children display toward drawing and construction in the pre-school years, it is unimportant whether or not their productions have technical merit.

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## EXERCISES

1. Analyze one of your recent learning exercises so that you can identify its passive and its active parts.
2. Ask one of your athletic friends to give you as complete a description as he can of a "hunch" which has come to him during play. Question him closely about it and about the events that gave rise to it.
3. Compare the account of a "hunch" which you get in this way with your own processes of reflective thinking.
4. Consult Dewey's *How We Think* (page 72) for the five stages of reflective thinking. During which of these stages might insight or creative thinking appear?
5. How are Dewey's five stages of thinking related to creative activity of the type described in this chapter?
6. Ask a friend in music or art to describe for you his own experiences when he is creating rather than copying.
7. Compare this description with reflective thought and bring out as far as you can the differences and the resemblances.
8. Go over some of your childhood memories with this question before you: What events served to promote and what served to hinder creative activity on your part?
9. Analyze the situations which seem to you to have hindered your own creative activity and ask yourself what might be done in the school to change them.
10. Can you think of any reason why the creative activity of the poet, the painter, or the musician should differ from the creative activity of the inventor or the scientist?
11. After you have read the chapter on Personality Adjustments, make critical comments on the theory that creative activity may be the result of conflict.
12. Ask your instructor for a reference on progressive schools and then compare these schools with your own in terms of the amount of creative activity.
13. Is there anything about the play life of small children that could be called creative? If so, how could this part of play be brought into the school?
14. Show how learning, even though it is mostly "intake" (II), must serve as the basis for creative activity.
15. Distinguish between creative activity and the urges, drives, or motives to creation.

## CHAPTER XIII

### PROBLEM-SOLVING LEARNING AND REFLECTIVE THINKING<sup>1</sup>

*J. Stanley Gray, University of Pittsburgh*

Beware when the great God lets loose a thinker on this planet. Then all things are at risk.<sup>2</sup>—RALPH WALDO EMERSON.

Every thinker puts some portion of an apparently stable world in peril, and no one can wholly predict what will emerge in its place.<sup>3</sup>—JOHN DEWEY.

Men fear thought as they fear nothing else on earth—more than ruin, more even than death. Thought is subversive and revolutionary, destructive and terrible; thought is merciless to privilege, established institutions, and comfortable habits; thought is anarchic and lawless, indifferent to authority, careless of the well-tried wisdom of the ages.<sup>4</sup>—BERTRAND RUSSELL.

The power to think is the educational kingdom of heaven; if we seek it persistently, other things will be added unto us.<sup>5</sup>—BOYD H. BODE.

#### I. Introduction

One of the most important phases of the growth process is conventionally designated as reflective thinking. This behavior is of great significance since it promotes growth along many lines, facilitates learning, and promotes progress when used for the purpose of human betterment. Many of the social, political, and economic ills and conflicts may be traced to man's inhumanity to man, that is, his lack of social imagination, sympathy and action, and to his inability to think clearly. Wars, social conflicts, and depressions have their roots in these disabilities. If there are any two things about which children should be indoctrinated, the first one is that the real business of living consists in self-realization through social functioning and the other is that the chief instrument of social and individual progress is re-

<sup>1</sup> The selections in this chapter will help students of psychology and education to understand the thinking processes of children and to understand how the teacher can better educate them to think more often and more effectively. This chapter may be used very profitably in connection with the following textbooks: Griffith, *An Introduction to Educational Psychology*, Chapter VII; Skinner and Collaborators, *Educational Psychology*, Chapter V; Trow, *Educational Psychology*, Chapter IX; Mursell, *Psychology of Secondary School Teaching*, Chapter VII; Gray, *Psychological Foundations of Education*, Chapters V and VIII; Ogden and Freeman, *Psychology and Education*, Chapter XIV; Leary, *Educational Psychology*, Chapter VIII; Wheeler and Perkins, *Principles of Mental Development*, Chapter VIII; Gates, *Psychology for Students of Education*, Chapters XI and XII; Collings and Wilson, *Psychology for Teachers*, Part III; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter XVI; Cameron, *Educational Psychology*, Chapter XII; and Bolton, *Everyday Psychology for Teachers*, Chapters XV and XVI.

<sup>2</sup> Ralph Waldo Emerson, "Circles," in *Essays*, 1st series. Boston: Houghton Mifflin Company, 1903, p. 308.

<sup>3</sup> John Dewey, *Characters and Events*. New York: Henry Holt and Company, 1929, Vol. I, p. 1.

<sup>4</sup> Bertrand Russell, *Why Men Fight*. New York: D. Appleton-Century Company, 1917, pp. 178-180.

<sup>5</sup> Boyd H. Bode, *Conflicting Psychologies of Learning*. Boston: D. C. Heath & Company, 1929, p. 274.

flective thinking along lines compatible with the business of living. The reason that social progress has been so slow is indirectly due to the kind of education we give our children.

Reflective thinking is one of the most important outcomes of instruction. In order to get these psychological outcomes, teachers must seek them. Subjects of instruction are but materials to which children react. They are but means to an end. When they are selected, organized, and presented in one fashion, only factual knowledge results. When they are selected, organized into problem-solving or project units, and presented by teachers who are properly oriented, a technique of reasoning develops. If children go through school without having learned to think, they have not been educated. If learning geography, history, literature, mathematics, science, and all the other branches, develops the power to relate, organize, synthesize, compare, generalize, and apply, growth has taken place.

Reasoning behavior may begin in very early childhood. The extent to which this behavior develops depends upon the kind and frequency of opportunities presented which call for a reasoned solution and the kind of direction given children in their purposing, planning, executing, and judging activities. There are no set patterns or fixed procedures to be followed. Each new problem is novel in some respect or other. While no two authorities reason in the same identical way, all scientists and good thinkers do observe certain general rules. They must be open-minded and free from bias. They must be able to recognize problems, define or delimit them, have a real want to solve them, possess a facility for making bold guesses or hypotheses, have enough relevant and dependable facts so as to constitute a good sampling, know how to organize, classify, and analyze their data so that their findings point to some conclusion or generalization, know how to verify tentative solutions or answers, and be able to make applications of the generalizations to other situations in different settings.

## II. What Is Thinking?

### THREE KINDS OF THINKING<sup>6</sup>

*John Dewey*

All the time we are awake and sometimes when we are asleep, something is, as we say, going through our heads. When we are asleep we call that kind of sequence "dreaming." We also have daydreams, reveries, castles built in the air, and mental streams that are even more idle and chaotic. To this uncontrolled coursing of ideas through our heads the name of "thinking" is sometimes given. . . .

Now reflective thought is like this random coursing of things through the mind in that it consists of a succession of things thought of, but it is unlike in that the mere chance occurrence of any chance "something or other" in an irregular sequence does not suffice. Reflection involves not merely a sequence of ideas, but a *con*-sequence—a consecutive ordering in such a way that each determines the next as its proper outcome, while each outcome in turn leans back on, or refers to, its predecessors. The successive portions of a reflective thought grow out of one another and support one another; they do not come

<sup>6</sup> From John Dewey, *How We Think*. Boston: D. C. Heath & Co., 1933, pp. 3-9.



and go in a medley. Each phase is a step from something to something—technically speaking, it is a *term* of thought. Each term leaves a deposit that is utilized in the next term. The stream or flow becomes a train or chain. There are in any reflective thought definite units that are linked together so that there is a sustained movement to a common end.

The second meaning of thinking limits it to things not sensed or directly perceived, to things *not* seen, heard, touched, smelt, or tasted. We ask the man telling the story if he saw a certain incident happen, and his reply may be, "No, I only thought of it." A note of invention, as distinct from faithful record of observation, is present. Most important in this class are successions of imaginative incidents and episodes that have a certain coherence, hang together on a continuous thread, and thus lie between kaleidoscopic flights of fancy and considerations deliberately employed to establish a conclusion. The imaginative stories poured forth by children possess all degrees of internal congruity; some are disjointed, some are articulative. When connected, they stimulate reflective thought; indeed, they usually occur in minds of logical capacity. These imaginative enterprises often precede thinking of the close-knit type and prepare the way for it. In this sense, a thought or idea is a mental picture of something not actually present, and thinking is the succession of such pictures.

In contrast, reflective thinking has a purpose beyond the entertainment afforded by the train of agreeable mental inventions and pictures. The train must lead somewhere; it must tend to a conclusion that can be substantiated outside the course of the images. A story of a giant may satisfy merely because of the story itself; a reflective conclusion that a giant lived at a certain date and place on the earth would have to have some justification outside the chain of ideas in order to be a valid or sound conclusion. This contrasting element is probably best conveyed in the ordinary saying: "Think it *out*." The phrase suggests an entanglement to be straightened out, something obscure to be cleared up through the applications of thought. There is a goal to be reached, and this end sets a task that controls the sequence of ideas.

A third meaning of thought is practically synonymous with *belief*. "I think it is going to be colder tomorrow," or "I think Hungary is larger than Jugo-Slavia" is equivalent to "I believe so-and-so." When we say, "Men used to think the world was flat," we obviously refer to a belief that was held by our ancestors. This meaning of thought is narrower than those previously mentioned. A belief refers to something beyond itself by which its value is tested; it makes an assertion about some matter of fact or some principle or law. It means that a specified state of fact or law is accepted or rejected, that it is something proper to be affirmed or at least acquiesced in. It is hardly necessary to lay stress upon the importance of belief. It covers all the matters of which we have no sure knowledge and yet which we are sufficiently confident of to act upon and also the matters that we now accept as certainly true, as knowledge, but which nevertheless may be questioned in the future—just as much that passed as knowledge in the past has now passed into the limbo of mere opinion or of error.

There is nothing in the mere fact of thought as identical with belief that reveals whether the belief is well founded or not. Two different men say, "I believe the world is spherical." One man, if challenged, could produce little or no evidence for thinking as he does. It is an idea which he has picked up from others and that he accepts because the idea is generally current, not because he has examined into the matter and not because his own mind has taken any active part in reaching and framing the belief.

Such "thoughts" grow up unconsciously. They are picked up—we know not how. From obscure sources and by unnoticed channels they insinuate themselves into the mind and become unconsciously a part of our mental furniture. Tradition, instruction, imitation—all of which depend upon authority in some form, or appeal to our own advantage, or fall in with a strong passion—are responsible for them. Such thoughts are prejudices; that is, prejudgments, not conclusions reached as the result of personal mental activity, such as observing, collecting, and examining evidence. Even when they happen to be correct, their correctness is a matter of accident as far as the person who entertains them is concerned.

Thus we are brought again, by way of contrast, to the particular kind of thinking that we are to study in this volume, *reflective thinking*. Thought, in the two first senses mentioned, may be harmful to the mind because it distracts attention from the real world, and because it may be a waste of time. On the other hand, if indulged in judiciously these thoughts may afford genuine enjoyment and also be a source of needed recreation. But in either case they can make no claim to truth; they cannot hold themselves up as something that the mind should accept, assert, and be willing to act upon. They may involve a kind of emotional commitment, but not intellectual and practical commitment. Beliefs, on the other hand, do involve precisely this commitment and consequently sooner or later they demand our investigation to find out upon what grounds they rest. . . .

*Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends* constitutes reflective thought. Any one of the first three kinds of thought may elicit this type; but once begun, it includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality.

### III. What Is the Psychological Nature of Thinking?

#### I. AN ANCIENT VIEW<sup>7</sup>

##### *Aristotle*

Regarding that part of the soul by virtue of which one knows and reflects, whether it be a distinct part or whether it be distinct only notionally and not

<sup>7</sup> From Aristotle, *Psychology, A Treatise on the Principle of Life* (translated by W. A. Hammond). London: Swan Sonnenschein and Co., Ltd., 1902, from Ch. IV.

really, we have now to consider what its differential mark is, and by what process thinking is exercised. If thinking is like sense perception, it would be either a kind of impression made by the object of cognition or some analogous process. It must, then, be impassive and yet receptive of the form, and in its nature potentially like to the object of thought without being this object; and as the sense organ is related to the object of sense, in a similar way thought must be related to the object of thought. Reason must, therefore, be unmixed, as Anaxagoras says, since it thinks everything, in order that it may rule, i.e., in order that it may know. It is the nature of thought to preclude and restrain the element that is foreign and adjacently seen. Its nature is, therefore, exclusively potentiality. What we call reason in the soul (by reason I mean the instrument by which the soul thinks and forms conceptions) is, prior to the exercise of thought, no reality at all. It is, therefore, wrong to suppose that reason itself is mixed with the body. For in that case it would have certain qualitative distinctions such as warm or cold, or it would be a sort of instrument, like a sense organ. But in point of fact it is nothing of the kind. Certain writers\* have happily called the soul the place of ideas, only this description does not apply to the soul as a whole, but merely to the power of thought, and it applies to ideas only in the sense of potentiality, and not of actuality. It is evident from the sense organ, and from the nature of sensation, that the term impassivity is employed in a different meaning in sensation and in thinking. For sense perception cannot take place when the sense stimulus is excessive, as one does not hear sound in the midst of loud noises, neither can one see nor smell in the midst of excessively bright colors and strong odors. On the other hand, when the mind thinks a very profound thought, it thinks not in a lesser but in a deeper degree minor details. For the power of sensation is not independent of the body, while the mind is separable. When reason becomes its several objects in the sense in which an actually learned man is said to be learned (and this takes place when he can exercise knowledge through his own agency), even then reason is in a certain sense potential, although this potentiality differs from that which preceded learning and discovery. In the latter case, potentiality signifies the capacity of thinking itself.

## 2. A MODERN VIEW

*Albert P. Weiss*

Professor Warren† has raised the question as to the behavioristic nature of "thinking." He states the problem in this form: "Is thinking essentially an *effector* phenomenon, or is it essentially a *neural* phenomenon? We do not know. The behaviorists believe that thinking is essentially an incipient or im-

\* Plato and the Academy.

§ From Albert P. Weiss, "Behaviorism and Behavior," *Psychological Review*, 31, Nos. 1 & 2, 1924, pp. 32-50; 118-149.

† H. C. Warren, "The Significance of Neural Adjustment," *Psychological Review*, 29, 1922, pp. 481-489.

plicit operation of the muscles or glands. The introspectionists believe it to be essentially an operation of the central nervous system." It seems to me that Warren has omitted what I have designated as the biosocial phase of the response. Biophysically, thinking is probably both central and effector, but this is true of all responses and if certain relations between sensory, central, and effector processes are of sufficient biosocial value to be grouped into a special category to which the name of thinking shall be given, our problem is that of designating what these relationships shall be, holding before us the historical and practical significance of this term. Proceeding along these lines most psychologists would agree that finding the square root of a number includes what at least historically has been designated as thinking. Suppose I am asked to "think out" the square root of 144. I select this simple problem because the conditions for most of my readers will resemble my own. What has occurred in sensorimotor terms after I have "thought out" the square root of 144 as 12? I frankly agree with Dr. Warren that I do not know. There was nothing so complicated as the motor processes that occurred during the time in which I was learning to *recite* the square roots of some of the easier numbers, or learning to *extract* the square roots of larger numbers. That there was any resemblance between the central neural processes that occurred during learning and those that have just occurred does not seem probable either. On the other hand would the solution of the problem in German be regarded as a different thought simply because the sensorimotor conditions were different? That there is something characteristic in the form of behavior which is called extracting the square root of a number seems certain. What are the specific factors? Without attempting an exhaustive analysis I find three relatively characteristic conditions: (a) a stimulus of the *problem* type, (b) an *interval* of longer or shorter duration, (c) a *solution* response. The traditional conception of thinking seems to imply that the thinker must be *able* to describe some earlier similar conditions (as imagery) during the *interval*, but he must not *actually* describe them. The *solution* is an overt response which meets some biosocial condition that has already been standardized or that is on the way toward becoming a standardized response to this type of stimulus. The specific character of thinking may thus be regarded as the occurrence of an implicit response to a problem stimulus in which the self-observer is able to (but does not) describe earlier but similar stimulating conditions, and responds overtly by some conventionalized response which is, or becomes, the solution.

I am not concerned whether my analysis of thinking into the three phases of problem stimulus, implicit response, overt solution response is accepted as the *best* analysis. I wish merely to make the point that we are here dealing with complex biosocial responses for which there are no specific neural correlates. Any attempt to actually enumerate and isolate even the *effector* processes, say in my square root illustration, is hopeless. To work toward an enumeration or description of the *central* neural processes is certainly beyond any practical range. But suppose we could localize every effector that functioned and designate the intensity of its functioning; enumerate every neural element in the

central nervous operation and its quantitative characteristics; could we from such data alone develop a classification which would conform to the historical meaning of the term thinking? Of course this is not essential; but then we may ask, why use the term at all? Are we not insisting that because faculty psychology created a faculty of thinking, there must be an equally specific sensorimotor correlate?

From the behaviorist point of view, the whole series of problems usually covered by "the higher thought processes" reduce themselves to remnants of the same type as those which resulted from the investigation of the "life principle." Originally, the word "life" was begun with a capital letter and appeared principally in sermons. Now that life has been analyzed into complex metabolic processes we do not expect to find one superphysiological process that may be regarded as its essential characteristic. Just what the higher thought processes will become when reduced to human behavior I am loath to guess. I do not wish to imply that there may not be implicit sensorimotor processes and configurations that are simple and yet socially very significant, but it seems to me that it would be more expedient to begin with a genetic and biosocial study of the responses, and let our classification be derived from these investigations. When we shall have determined the biophysical and biosocial conditions under which such a response as that of "acceleration" has been *acquired*, the problem of "thinking" will be replaced by other classifications.

#### IV. What Are the Steps in the Thinking Process?

##### I. DEWEY'S ANALYSIS<sup>9</sup>

##### *Columbia Associates in Philosophy*

When thought, however, is bent on solving a problem, on finding out the meaning of a perplexing situation, or reaching a conclusion which is trustworthy, it is to be distinguished from other types of mental activity and should be called reflection. Such thinking may be defined as: "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends."

*The occasion of reflection.*—The occasion of reflective thought becomes clear when the activities of a day are reviewed. We rise, dress, breakfast, read headlines, go to business, but only when the morning's mail brings up a question requiring a decision does real thought make its appearance. Thought comes when decisions or conclusions are necessary, when the usual succession of acts is interrupted and consideration has to be given to the next step. A doctor thinks when he has to diagnose a new case, a lawyer thinks when he considers the elements of a dispute and their relation to precedent, a student thinks when he applies his knowledge to a solution of an original problem

<sup>9</sup> From *Columbia Associates in Philosophy, An Introduction to Reflective Thinking*. Boston: Houghton Mifflin Company, 1923, pp. 2-6.

in geometry, a city official thinks when he considers the best method of making a tax levy or improving the school system.

*The definition of the difficulty.*—In each of the cases a difficulty is faced. The morning's letter asks whether money should be invested in the common stock of an industry or in government bonds. Before any progress can be made in reaching an answer, the conditions of the question must be clarified. A widow of slender means is asking the question, how she may invest her capital most safely and profitably. The reader of the letter, understanding her situation, has cleared his field, and the next step in thinking occurs.

*The rise of suggestions.*—This next step is the rise of suggestions or possible answers. What advice is to be given—that is the perplexity. Answers flash up—buy bonds, buy stocks, buy neither, but rather buy a farm mortgage. Such suggestions or others would arise. The psychological machinery of their appearance we do not fully understand, but the factors conditioning their excellence may be named. Save by chance, penetrating suggestions come only (a) when the difficulty is clearly defined, (b) when the thinker is thoroughly familiar with the background into which the problem fits and has had a wide range of experience with similar difficulties, (c) when the thinker has a more or less indefinable something called now native ability, now disciplined but daring imagination, now shrewdness, now penetration.

*The mental elaboration of suggestions.*—When the suggestions have arisen, they must be tested by reference to foundations and consequences. Suppose the idea of buying stock should be entertained as the solution. In thought the circumstances attending such investment would be reviewed—is the stock safe, what is its cost, what its return, what its likelihood of ready sale. Each item would be considered in reference to the conditions of the purchaser, and if all the factors surveyed in the mental investigation fitted her need, the suggestion to buy stock would be thought to be a good one; if not, other proposed solutions would be tried in the mental examination.

*Evidence in fact and conclusion.*—When the suggestion is accepted, after this imaginative grilling, as apparently true, the careful thinker seeks confirming evidence—he may seek to ascertain the opinion of others as to the wisdom of his view, or investigate the class of persons holding the stock. Such investigation may confirm his opinion and leave him ready to accept his judgment and say “buy.” Unhappily, before his advice is given he cannot, as he might in other kinds of decisions, experiment with the actual operations of his conclusion before determining finally upon practice. His experimentation for the verification of his belief must be undertaken at the widow's expense, since after she follows his advice the genuine verification will follow when time shows whether the stock bought proves a safe and lucrative investment. The closing of the reflective process incident to his reaching a conclusion comes, however, only after the experimental verification.

2. KILPATRICK'S ANALYSIS<sup>10</sup>*William H. Kilpatrick*

## THE STEPS IN THE COMPLETE ACT OF THOUGHT

1. A situation arouses an impulse or tendency to pursue a certain course of action.

The baby's crying stirs the mother to seek to relieve him. Unexpected movements in Uranus stir the astronomer to try to explain these movements.

2. A difficulty appears: how to continue the given course is not known; there is no appropriate way of responding known or immediately available.

The mother does not know what to do for the baby. The astronomer has no satisfactory explanation for the movements of Uranus.

3. An examination of the situation is made to locate and define the difficulty more precisely.

The mother listens to the baby and considers his movements. The astronomer measures carefully the deviation of Uranus from what had been expected and considers all possible interfering causes. Each is meanwhile considering all the facts with reference to possible solutions.

4. Suggested solutions arise: hypotheses are formed, behavior patterns are suggested.

The baby is cold or perhaps has colic. Uranus is attracted by some hitherto unknown planet yet more distant from the sun.

5. Implications (one or more) are drawn from each suggested solution, each hypothesis.

If the baby is cold, covering him more warmly will relieve his discomfort. If a planet is attracting Uranus, we should see it in such and such part of the sky.

6. Actual trial is made to see where the deduced implications hold.

Does the baby stop crying when covered? Do we find the new planet where we were told to look, and is it such as to explain the aberrations of Uranus?

7. A solution is accepted in the light of the tests made.

<sup>10</sup> From William H. Kilpatrick, *Foundations of Method*, 1925, pp. 242-243. By permission of The Macmillan Company.

3. GRAY'S ANALYSIS <sup>11</sup>*J. Stanley Gray*

The process of problem-solving can be analyzed into a series of definite steps which may be said to characterize good thinking. We so frequently talk glibly about the importance of good thinking, but so seldom know exactly what it is. The following steps are characteristic of careful problem-solving, whether in the field of science, government or everyday living. They constitute the technique of good thinking.

(1) *Sensitivity to problems.*—A problem is a difficulty or a situation which demands adjustment. It exists only when solution responses are made. A situation which constitutes a problem for one individual may not elicit solution behavior from another. A distinguishing characteristic of the educated man is that he is sensitive to problems, i.e., he tries to solve them. Only the ignorant are oblivious to the problems about them.

To understand a problem is to be able to describe it exactly. This is a long step toward solution and an essential preliminary to further progress. Clear thinking is impossible without a clear understanding of the problem which thinking concerns.

Obviously the educator can teach pupils to be more sensitive to problems. School environment should be pregnant with problem situations. Pupils, then, should be free to evolve and formulate their own problems. They cannot learn to recognize problems if the teacher insists on pointing them out. The educator must realize that the entire problem-solving process is learned only when the pupils perform it for themselves.

(2) *Knowledge of problem conditions.*—Problems can be stated, but they cannot be understood until data have been collected concerning them. It is only when one becomes familiar with the conditions of the problem that it is understood. Such information contains the key to the solution. A thorough knowledge of problem conditions makes further solution behavior less difficult.

Here again education plays a major role. It enables the problem-solver to recognize significant information. The uneducated individual cannot distinguish facts which are of worth from those which are not. Such ability comes only from experience in problem-solving. One learns to judge the significance of problem data only after he has solved a great many problems. Note that knowledge has meaning only in relation to specific problems. Too much present-day education (so-called) drills the child in fact learning per se. Information is considered as an end in itself instead of an essential means to an end. Knowledge learning is the second step in problem-solving and should not precede the first. Facts have but little significance unless they are learned as a means of solving some problem.

<sup>11</sup> From J. Stanley Gray, "What Sort of Education Is Required for Democratic Citizenship?" *School and Society*, September 14, 1935, pp. 353-356.



(3) *Suggested solution or hypothesis.*—As the data concerning a problem are collected, possible solutions will be suggested. Some will obviously be worthless, but others will appear sufficiently plausible to merit specific statement. They will then constitute plans for further solution behavior. They will attempt to predict how the problem can be solved.

If the data are properly interpreted and one of the suggested solutions is accurate (i.e., turns out to be the real solution), the procedure is then called intelligent. The intelligent individual is one who can solve problems with the least number of errors or can predict solutions with the greatest degree of accuracy.

This step is largely neglected in conventional education. Facts are interpreted for the student, and consequently he does not learn to think. The student must be allowed to interpret his own data and formulate his own hypotheses, even though he makes frequent errors. He cannot learn to think by allowing the teacher to think for him. Learning does not take place by proxy. Accurate prediction in problem-solving is learned by experience in doing just that.

(4) *Subjective evaluation.*—This step is essentially a process of comparing the suggested solution (step 3) with the problem conditions (step 2) to see if it will work. It is an exercise in imagination to "foresee" the problem consequences. Here again, intelligence is essential. But if the problem has been described in detail, if the data are stated accurately and exactly, and if the suggested solution has been applied to the problem conditions with vivid imagination, the probable success of the hypothesis will be evident. Intelligent behavior, or accurate prediction, is greatly simplified by exactness and simplicity. Keen thinking is always characterized by careful language statement.

The performance of these last two steps constitutes a sort of mental trial-and-error procedure. When an hypothesis is obviously wrong, it is necessary to return to step 3 and formulate a new one. The process of comparing it with the problem conditions is then repeated and it, too, is accepted or rejected.

Proficiency in performing this step depends on one's experience. If the student is encouraged to evaluate hypotheses for himself, he will soon develop habits of exactness in his thinking and consequent accuracy in his predictions. Again, the teacher must not think for the child.

(5) *Objective test.*—When a trial solution has passed the scrutiny of subjective evaluation, the next step is to test it out objectively. This may be done by laboratory experiment, controlled observation, historical investigation, etc. No human thinking is so infallible that objective verification is unnecessary. Unfortunately, however, many of our problems, especially those of human relationships, are so complicated that all variables cannot be controlled. Consequently, our solutions are unproven and possibly wrong.

This step marks the difference between philosophical and scientific thinking. The scientist tests his hypotheses while the philosopher does not. The latter has confidence in the accuracy of human thinking, while the former insists that it is subject to error. Because our solutions to governmental and

social problems cannot be accurately tested, they must be classified as philosophical and therefore tentative. Philosophical thinking is untested thinking.

The direction of progress is toward tested thought. New and accurate methods of objective verification are being developed, and traditional but unproven beliefs are being discarded. What is, is not necessarily what ought to be. Never before has there been such a general demand for tested and proven solutions as now.

The function of education in this step is evident. Students can be trained to accept solutions without test, and become worshipers of authority and tradition, or they can be trained to react critically and doubtfully to solutions which have not been proven of objective worth. Conventional, or old-type, education produces the former type of thinking, while progressive education produces the latter. The former is the method of bigotry and dogmatism, while the latter is the method of science and civilization. Certainly American educators should be concerned with teaching our coming citizenship that untested thought is often wrong and therefore dangerous; that traditional belief is not evidence of truth; and that objective verification of thinking is the most advanced state of social evolution.

(6) *Conclusion or generalization.*—A very important feature of any behavior is the degree to which it affects future behavior. Education of most worth is that which is most beneficial in later life. We can profit from past experience only when that experience “transfers” to future occasions. In problem-solving behavior, part of this transfer takes place through the data. The same facts may be used in solving two or more problems. Thus the facts learned in one problem situation may have worth in subsequent situations. However, a greater amount of transfer takes place if a generalization (a language description of the common characteristic of a classification) grows out of a problem-solving procedure which applies to future problems. For example, a teacher may find by reasoning and experiment (problem-solving) that children learn more facts and understand them better when general science is taught by the problem-solving method (sometimes called the laboratory method). If she then faces the problem of how to teach history and believes that it comes within the same classification as general science (in respect to method of teaching), she will conclude that history, too, can be taught best by problem-solving. . . .

No place in the entire problem-solving process is the function of education so important as in generalizing. The tendency of youth to rush on from one problem to another without any attempt to attain permanent values from the process is quite evident. Education can stimulate the child to learn something from each problem solved and to discover relationships between problems. It can create an environment which will foster intellectual interest as well as pragmatic interest. The discovery and description of causal relationships (generalizing) are matters of training, a racial heritage which should be passed from one generation to another.

## V. What Are the Common Errors in Thinking?

I. BACON'S FOUR IDOLS OF THINKING<sup>12</sup>

*Albert E. Avey*

It is very necessary to successful and fruitful discussion that the initial assumptions be accepted on both sides. Without this, controversies prove interminable, and no one is convinced of what he did not believe to begin with.

Francis Bacon, in his famous work, the *Novum Organum*, asserted that the human mind is characterized by certain native prejudices or assumptions that it takes for granted in its judgment of things, but which are distinctly reflections of the observer's point of view and stand in the way of true objectivity in thinking. He called them Idols which we inadvertently worship with our intellectual faculties, and named them the *idol of the tribe*, the *idol of the cave*, the *idol of the market place*, and the *idol of the theater*.

The *idol of the tribe* is the assumption that the human point of view is ultimate in the universe. As human beings we assume that that which works toward human welfare is necessarily good and that which works to the detriment of humanity is bad. We assume that the long-standing convictions of the race are true and will survive all time. We assume that human modes of knowledge are absolute, that our ways of knowing things are the ultimate ways. But one of the lessons humanity has to learn is that nature does not always value what human beings value. At times she sweeps away ruthlessly all that humanity holds dear. She makes her sun shine on the just and the unjust. She also destroys in the hurricane saint and sinner alike. The true scientist must learn to assume an impartial attitude which enables him to know the operations of the world regardless of their relations to human weal or woe.

The *idol of the cave* is the prejudice of the individual's preference. Each one of us looks at things from his or her special point of view. To the chemist all things, human as well as nonhuman, are chemical compounds. To the physicist they are electrons and protons. To the theologist they are manifestations of a Divine Will. To the moralist they are instruments of good or evil. Each one reads the universe in terms that are familiar to him. But in this way each misses the infinite variety and complexity of structure, function and meaning in the world.

The *idol of the market place* consists in respect for words without appreciation of the meaning which lies back of them. Scientific terms are glibly uttered as if thereby riddles of the universe were solved. Theological vocabulary is bandied about with great unction and satisfaction even though definition of the conceptions would prove impossible. The name of a political party constitutes a rally point of deathless devotion even though the party stands now for doctrines which ten years ago it repudiated with all its might. Call

<sup>12</sup> From Albert E. Avey, *The Functions and Forms of Thought*. New York: Henry Holt and Company, 1927, pp. 323-325.

a theory by the name evolution and you violate state law. Call it development and your teaching is welcomed with interest.

The *idol of the theater* consists in respect for great names, without knowledge of that which made them great. The name of Washington is cited against the formation of entangling alliances, by many who are not at all aware of the background of Washington's thinking when he made the statement. The names of Darwin, Huxley, Mendel, and many others are offered as proving the truth of certain biological doctrines, instead of the facts which led these men to hold the views they did. Even great men sometimes err. They sometimes pass judgment upon questions not within the field of their own special attainment. Or even within that field they sometimes voice hypotheses which in the state of knowledge of their day cannot be more than tentative, and which further knowledge will set aside.

## 2. PERVERSIONS IN THINKING<sup>18</sup>

*John J. B. Morgan*

What do we mean when we say a person has lost his reason? The reasoning of some persons becomes so distorted and twisted that it follows neither rhyme nor reason, and no one can follow them. It appears on the surface that their disorder is primarily a disorder of their rational processes, that they have lost their power to think clearly.

Study of such individuals has revealed the significant fact that their trouble is not primarily with their rational processes, but that they have used their reasoning to hide some other difficulty. Their distorted reasoning is a defense mechanism which they use to disguise from themselves and from others their main difficulty. This distinction is important because, if anything is to be done for such persons, the real trouble must be treated rather than the rational processes. In other words, you cannot argue with these irrational persons; they will give you counter arguments ad infinitum and you will get nowhere. Get the real trouble ironed out and reasoning will take care of itself. . . .

Most of the trouble which reason is adopted to disguise lies in the emotional field. The reasoning of those who are deluded is dominated by their emotions, and is used merely to justify perverted emotions. They wish to believe and then use their rational processes to justify these beliefs. Let us examine some ways in which this takes place.

(1) *Distortion of evidence.*—Accuracy in reasoning depends, in the first place, upon the truth of the facts which one gathers about which to reason. If these facts are distorted, obviously the reasoning based upon them will be in error. The truth of an argument depends upon the truth of the premises with which one starts.

Facts may be distorted in two ways. One may actually perceive facts incorrectly or he may make a biased selection of facts, ignoring those which

<sup>18</sup>From John J. B. Morgan, *Keeping a Sound Mind*, 1934, pp. 214-222. By permission of The Macmillan Company.

he does not wish to consider, which might spoil his argument, and emphasizing others which support his beliefs. Both of these may lead to vicious results, although the latter may be more insidious in its operations. . . .

The scientist makes an heroic attempt to overcome these well-known human weaknesses. He does it by developing instruments of precision; he devises machines to record facts as they are, so that his judgment and his bias will be eliminated. Where he cannot measure facts with instruments he obtains the reports of various persons with opposing biases and attempts to get at the truth by combining these diverse observations. For example, if a sociologist wants to get an estimate of the behavior of a certain individual he takes the reports of several persons who love the individual and weighs them against the reports of an equal number of persons who hate him; or better yet, he gets the reports of a number of persons who apparently have no preformed opinion of any sort. . . .

(2) *Unwise generalizations*.—Another source of fallacious reasoning is the tendency to make broad generalizations from a few facts. Science proceeds on the basis of generalizations from concrete experiences and states these generalizations in the form of principles which have a wider application than the facts upon which it is based would warrant. But science protects itself from error by never taking too seriously these principles. They are regarded as hypotheses—that is, guesses—which are subject to further verification or modification with accumulating facts.

Most slogans get their following, not because they have ever been tested, but because they are repeated so often that we begin to accept them. We have all been the victims of such sweeping statements as: "Make the world safe for democracy," "Save and prosper," "Buy and bring prosperity," "Spare the rod and spoil the child," "Your best friend won't tell you."

The great danger which arises from generalizations lies in the fact that there is always some truth in them. They are true in some instances and because of this fact we are led to believe that they are true in every case. Perhaps the world should be made safe for democracy; it does not follow that war was the only way to bring that about or even that it was the best way. Some persons who save prosper and some who buy prosper; it is a question of buying or saving at the right time. Some persons may need to be whipped but that does not prove the wisdom of the indiscriminate use of punishment.

(3) *Misuse of analogies*.—An analogy proceeds on the unsound assumption that if two or more things agree with one another in some respect, they will agree in other respects. When we define an analogy in this manner, its limitations and dangers are apparent and few of us would be deceived by it. In actual use, however, it is usually disguised so subtly that its distortions are not apparent and it provides one of the most insidious forms of deceiving ourselves and others. . . .

The force of illustration to carry a point with an audience is based largely on this form of deception. The auditors are able to visualize the illustration

and because of this clarity of the illustration they think that they understand the abstract principle which the illustration represents. An analogy makes a point clear but it never proves anything. Yet if you want to convince people of a fact you may do it more easily by a forceful illustration than by any other device.

## VI. How Can Children Be Taught to Think?

### I. THE FUNCTION OF THE TEACHER<sup>14</sup>

*John Dewey*

Bare reference to the imitiveness of human nature is enough to suggest how profoundly the mental habits of others affect the attitude of the one being trained. Example is more potent than precept, and a teacher's best conscious efforts may be more than counteracted by the influence of personal traits that he is unaware of or that he regards as unimportant. Methods of instruction and discipline that are technically faulty may be rendered practically innocuous by the inspiration of the personal method that lies back of them.

To confine, however, the conditioning influence of the educator, whether parent or teacher, to imitation is to get a very superficial view of the intellectual influence of others. Imitation is but one case of a deeper principle—that of stimulus and response. *Everything the teacher does, as well as the manner in which he does it, incites the child to respond in some way or other, and each response tends to set the child's attitude in some way or other.* Even the inattention of the child to the adult is often a response that is the result of unconscious training. The teacher is rarely (and even then never entirely) a transparent medium of the access of another mind to a subject. With the young, the influence of the teacher's personality is intimately fused with that of the subject: the child does not separate or even distinguish the two. And as the child's response is *toward* or *away from* anything presented, he keeps up a running commentary, of which he himself is hardly distinctly aware, of like and dislike, of sympathy and aversion, not merely upon the acts of the teacher, but also upon the subject with which the teacher is occupied.

The extent and power of this influence upon morals and manners, upon character, upon habits of speech and social bearing, are almost universally recognized. But the tendency to conceive of thought as an isolated faculty often blinds teachers to the fact that this influence is just as real and pervasive in intellectual concerns. Teachers, as well as children, stick more or less to the main points, have more or less wooden and rigid methods of response, and display more or less intellectual curiosity about matters that come up. And every trait of this kind is an inevitable part of the teacher's method of teaching. Merely to accept without notice, slipshod habits of speech, slovenly inferences, unimaginative and literal response, is to indorse these tendencies and to ratify them into habits—and so it goes throughout the whole range of con-

<sup>14</sup> From John Dewey, *op. cit.*, pp. 58-61.

tact between teacher and student. In this complex and intricate field, two or three points may well be singled out for special notice.

*Judging others by ourselves.*—Most persons are quite unaware of the distinguishing peculiarities of their own mental habits. They take their own mental operations for granted and unconsciously make them the standard for judging the mental processes of others. Hence there is a tendency to encourage whatever in the pupil agrees with this attitude and to neglect or fail to understand whatever is incongruous with it. The prevalent overestimation of the value, for mind training, of *theoretic* subjects as compared with practical pursuits, is doubtless due partly to the fact that the teacher's calling tends to select those persons in whom the theoretic interest is specially strong and to repel those in whom executive abilities are marked. Teachers sifted out on this basis judge pupils and subjects by a like standard, encouraging an intellectual one-sidedness in those to whom it is naturally congenial, and repelling from study those in whom practical instincts are more urgent.

*Undue reliance upon personal influence.*—Teachers—and this holds especially of the stronger and better teachers—tend to rely upon their personal strong points to hold a child to his work, and thereby to substitute their personal influence for that of subject matter as a motive for study. The teacher finds by experience that his own personality is often effective where the power of the subject to command attention is almost nil; then he utilizes the former more and more, until the pupil's relation to the teacher almost takes the place of his relation to the subject. In this way the teacher's personality may become for the pupil a source of personal dependence and weakness, an influence that renders the pupil indifferent to the value of the subject for its own sake.

*Satisfying the teacher instead of the problem.*—The operation of the teacher's own mental habit tends, unless carefully watched and guided, to make the child a student of the teacher's peculiarities rather than of the subjects that he is supposed to study. His chief concern is to accommodate himself to what the teacher expects of him, rather than to devote himself energetically to the problems of subject matter. "Is this right?" comes to mean "Will this answer or this process satisfy the teacher?"—instead of meaning "Does it satisfy the inherent conditions of the problem?" It would be folly to deny the legitimacy or the value of the study of human nature that children carry on in school, but it is obviously undesirable that their chief intellectual problem should be to produce the answer approved by the teacher, and that their standards of success should be successful adaptation to the requirements of another person.

## 2. THE FUNCTION OF THE CURRICULUM<sup>15</sup>

*John Dewey*

Studies are conventionally grouped under these heads: (1) those especially involving the acquisition of skill in performance—the school arts, such as read-

<sup>15</sup> From John Dewey, *op. cit.*, pp. 61-64.

ing, writing, figuring, and music; (2) those mainly concerned with acquiring knowledge—"informational" studies, such as geography and history; and (3) those in which skill in doing and bulk of information are relatively less important, and appeal to abstract thinking, to "reasoning," is most marked—"disciplinary" studies, such as arithmetic and formal grammar. Each of these groups of subjects has its own special pitfalls.

In the case of the so-called disciplinary or pre-eminently logical studies, there is danger of the isolation of intellectual activity from the ordinary affairs of life. Teacher and student alike tend to set up a chasm between logical thought, as something abstract and remote, and the specific and concrete demands of everyday events. The abstract tends to become so aloof, so far away from application, as to be cut loose from practical and moral bearing. The gullibility of specialized scholars when out of their own lines, their extravagant habits of inference and speech, their ineptness in reaching conclusions in practical matters, their egotistical engrossment in their own subjects, are extreme examples of the bad effects of severing studies completely from their ordinary connections in life.

The danger in those studies where the main emphasis is upon acquisition of skill is just the reverse. The tendency is to take the shortest cuts possible to gain the required end. This makes the subjects *mechanical*, and thus restrictive of intellectual power. In the mastery of reading, writing, drawing, laboratory technique, etc., the need for economy of time and material, of neatness and accuracy, for promptness and uniformity, is so great that these things tend to become ends in themselves, irrespective of their influence upon general mental attitude. Sheer imitation, dictation of steps to be taken, mechanical drill, may give results most quickly and yet strengthen traits likely to be fatal to reflective power. The pupil is enjoined to do this and that specific thing, with no knowledge of any reason except that by so doing he gets his result most speedily; his mistakes are pointed out and corrected for him; he is kept at pure repetition of certain acts till they become automatic. Later, teachers wonder why the pupil reads with so little expression, and figures with so little intelligent consideration of the terms of his problem. In some educational dogmas and practices, the very idea of training the mind seems to be hopelessly confused with that of a drill which hardly touches *mind* at all—or touches it for the worse—since it is wholly taken up with training skill in external execution. This method reduces the "training" of human beings to the level of animal training. Practical skill, modes of effective technique, can be intelligently, nonmechanically *used* only when intelligence has played a part in their *acquisition*.

A false opposition is often set up also, especially in higher education, between information and understanding. One party insists that the acquisition of scholarship must come first, since intelligence can operate only on the basis of actual subject matter that is under control. The other party holds that scholarship for and by itself is at best an end only for the specialist, the graduate student, etc., and that the development of power to think is the chief



thing. The real desideratum is getting command of scholarship—or skill—under conditions that *at the same time* exercise thought. The distinction between information and wisdom is old, and yet requires constantly to be redrawn. Information is knowledge that is merely acquired and stored up; wisdom is knowledge operating in the direction of powers to the better living of life. Information, merely as information, implies no special training of intellectual capacity; wisdom is the finest fruit of that training. In school, amassing information always tends to escape from the ideal of wisdom or good judgment. The aim often seems to be—especially in such a subject as geography—to make the pupil what has been called a “cyclopedia of useless information.” “Covering the ground” is the primary necessity; the nurture of mind a bad second. Thinking cannot, of course, go on in a vacuum; suggestions and inferences can occur only to a mind that possesses information as to matters of fact.

But there is all the difference in the world whether the acquisition of information is treated as an end in itself, or is made an integral portion of the training of thought. The assumption that information that has been accumulated apart from use in the recognition and solution of a problem may later on be, at will, freely employed by thought is quite false. The skill at the ready command of intelligence is the skill acquired with the aid of intelligence; the only information which, otherwise than by accident, can be put to logical use is that acquired in the course of thinking. Because their knowledge has been achieved in connection with the needs of specific situations, men of little book learning are often able to put to effective use every ounce of knowledge they possess; while men of vast erudition are often swamped by the mere bulk of their learning, because memory, rather than thinking, has been operative in obtaining it.

### 3. TWO WAYS TO TEACH THINKING<sup>16</sup>

*Boyd H. Bode*

The cultivation of thinking is an undertaking that calls for much more art in teaching than does the inculcation of more or less routine learning. The analysis of the process that we call thinking affords various clues which may be useful to a teacher. It may be worth while, however, to suggest that one way of stimulating thinking is clearly through the conduct of the recitation. Here we can profitably take a leaf from Socrates' book. The method which has come down through the centuries as the Socratic method is, in the main, the question-answer method, so directed as to make the learner develop and amplify what he has learned through a variety of applications. This procedure may start with a seemingly isolated fact or proposition and relate it to other facts or propositions in such a way that the entire set of facts must be reinterpreted in order to make them fit together. As an illustration we may take the hypothesis of the circulation of the blood. In order to reconcile this

<sup>16</sup> From Boyd H. Bode, *Modern Educational Theories*, 1926, pp. 216-218. By permission of The Macmillan Company.

hypothesis with the known facts of the organism, it was necessary to reinterpret the function of heart and lungs and blood vessels so as to reach a new conception of the manner in which a living organism maintains itself. All this was once a problem of hard scientific thinking. The chief difference between the scientist and the pupil is that, in the case of the pupil, the process of reorganization or reinterpretation of experience takes place under the guidance of the teacher. It is, however, something that the pupil must do for himself. The art of the teacher consists in knowing how to ask questions, how to suggest relevant facts, and how to present difficulties and suggest leads; and in appreciating the value, on occasion, of following up a false trail. The teacher's task is to furnish a maximum of stimulation and guidance, without hindering the pupil in the work of rebuilding his world.

A second way of securing worth-while results in teaching is through organization of material and supervised study in such a way as to make studying something more than the passive absorption of facts. The purpose of the organization is to make a demand on the initiative of the pupil. The problem in hand may be mainly deductive in character, as in the solution of a mathematical problem; it may be chiefly a matter of looking up facts in the library; it may involve considerable experimentation, as in testing methods of feeding stock on the farm; or it may be a problem of construction, such as drawing maps or plotting curves, or working with a piece of apparatus. The important thing is that conditions be made favorable for inquiry and interpretation on the part of the pupil. This is a matter of developing a background and connecting the subject that is being studied with the pupil's interests, which calls for an organization of assignments, conditions of study, and recitations that will make for independent and effective thinking.

## VII. What Is the Significance of Thinking Ability in Personality Development?

### PROBLEM-SOLVING AND MENTAL HYGIENE<sup>17</sup>

*Lawrence F. Shaffer*

The most general principle of positive mental hygiene, which includes most of the others, is to *employ the scientific method for the solution of personal problems*. The same form of attack that serves to unravel the universal complexities of nature can be used to discover the best adjustments for individual difficulties. The first need is for data, for evidence concerning the problem. The individual considers his situation objectively and evaluates its importance. He talks of it with someone, both integrating his own conceptions and gaining another's advice and point of view. A second step is to formulate various hypotheses for the solution of the adjustive problem. The courses of action that are possible are considered, and the immediate and re-

<sup>17</sup> From L. F. Shaffer, *The Psychology of Adjustment*. Boston: Houghton Mifflin Company, 1936, pp. 539-540.

mote results of each of these are weighed. Finally, on a basis of these reasonable conclusions, the individual decides on a method of adjustment and acts on it at once, vigorously and persistently. The test of the adjustive hypothesis is its individual satisfyingness and its social value. If it fails, another plan is tried, just as the scientist attempts another theory after one has been disproved.

The person who is able to secure a balanced satisfaction of his motives by carefully planned courses of action will achieve adjustment and effective living, which is good mental health.

### VIII. What Is the Significance of Thinking Ability in Occupational Success?

#### PROBLEM-SOLVING AND OCCUPATIONAL SUCCESS<sup>18</sup>

*Anthony M. Goldberger*

It is interesting and probably significant that little doubt exists in the minds of modern psychologists and philosophers that thinking and problem-solving are inherent parts of occupational success. Illustrations of problem-solving are most frequently drawn from the world of occupations. In this very volume Dewey draws his examples of thinking from the activities of the doctor, the lawyer, the city official; and Kilpatrick, from the activities of the mother and the astronomer.

The question to be discussed here is not whether problem-solving is necessary to occupational success but rather the extent to which occupational success on various levels of occupational activities is conditioned by problem-solving ability. Existent classifications of activities would be of little value as a basis for this discussion. The census classification (agriculture, farming, and animal industries, etc.) is such a broad one that it includes the farm laborer who does the work of a horse in a treadmill at one extreme and the scientific farmer at the other. The same objection holds with regard to all of the other occupational classifications of the census. Apparently no one has made a classification of occupations from the point of view of the nature and quantity of thinking required for their successful pursuit. The following tentative classification, therefore, is suggested for consideration.

First, there are occupations whose primary activity is centered about problem-solving. Skill, whether physical or mental, may be a part of these occupations but is not the essence of them. Einstein, Steinmetz, Carroll, Curie, the Wright brothers, Watt, Stephenson may be cited as examples of men whose achievement has been primarily in the field of problem-solving. The professions probably contribute a large proportion of the examples of problem-solving occupations although they have not exclusive possession of this kind of thinking. It is quite possible that there is just as real problem-solving ability in the skilled "trouble shooter" who works as a trained mechanic in an auto-

<sup>18</sup> This statement was prepared especially for this publication by Professor Goldberger.

mobile repair shop as there is in the university-trained medical diagnostician. Professions of today were at some time in the past only trades. Some trades of today will become professions in the future. Professionalization does not create problem-solving needs. Probably it rather serves to increase the basic knowledges which help the thinker to set up hypotheses and evaluate them.

A second classification includes those occupations in which skill is of primary importance but not sufficient in itself to result in success. "Ingenuity," "resourcefulness," "originality" are terms often used to describe qualities needed in addition to skill to achieve success in such occupations as pattern-making, toolmaking, custom dressmaking, and so on. The old-time carpenter who designed and built the beautiful winding staircases found in some of the fine old homes in our country may not have been an architect, but he was a stair builder who solved the same problems that would have confronted him if he had been an architect.

A third group of occupations might include those in which the ability to solve problems not only is not needed for success but may actually be a hindrance. Repetitive jobs in industry and on the farm will probably be done as successfully by persons who have practically no problem-solving ability as by those whose thinking ability is sufficient to make them dissatisfied with the monotony of doing the same thing endlessly. Dissatisfaction of this sort leads to labor turnover more frequently than is satisfactory to employers.

Two things should be observed in connection with the foregoing classification. First, it is probably a continuous series in which there is a regular increase from the absence of thinking at one end to practically exclusive problem-solving activity at the other. Second, at any point in the series there is a tendency toward a further crystallization which serves to move some of the occupations upward and others downward on the thinking scale. Specialization in any field—industrial, professional, or commercial—has the effect of centralizing functions in special groups. When shoes were made in their entirety by one person, that person had to exercise whatever problem-solving ability was needed in order to make shoes. As division of labor in our industrial system entered the shoemaking trade it concentrated the problems in the hands of the executives, superintendents, and foremen and mechanized the work of the great mass of people who operated shoemaking machines. In a somewhat similar way bookkeeping, which was formerly done completely and solely by a bookkeeper, is now done by a mass of posting clerks, billing clerks, and others, while an accountant is given the responsibility for whatever planning and thinking exist in the jobs. Even the professions have not been free of this influence. Large firms of attorneys now employ lawyers whose chief function is a highly specialized one—for example, the examination of court decisions rather than the complete planning of a case.

Any analysis of the place of problem-solving in occupational success must of necessity be a tentative one. Occupations which have thinking content in them today will be mechanized tomorrow. New occupations with new problem-solving requirements are being born each day.

# IX. What Is the Significance of Thinking Ability in Democratic Citizenship?

THINKING IN A DEMOCRACY<sup>19</sup>

J. Stanley Gray

*Education should prepare individuals for citizenship appropriate for the form of government under which they live.*—Any form of government can perpetuate itself only if it educates the oncoming generations to be good citizens. A dictatorial government must educate its youth to believe that dictatorial authority is justified. The children of Russia are properly being educated to believe in the teachings of Karl Marx and Lenin. Mussolini demands that the schools of Italy teach the principles of fascism. Good citizens in Russia and Italy are good followers of their respective governmental leaders. It is obviously necessary for the schools to be in harmony with the form of government. It is, therefore, crucial for educators to understand the type of citizen demanded by the government under which they live. It would seem that this assumption is justifiable.

*Good democratic citizenship consists of participation in government through intelligent exercise of the right of suffrage.*—Good citizenship in a democracy is vitally different from good citizenship in an autocracy. Government in a democracy is only with the consent of the governed. All rights to leadership and authority are granted by the *people*. The citizen is always supreme, and he exercises that supremacy through suffrage.

The word *intelligent* is used here to indicate that form of behavior which is in response to the accurate prediction of consequences. The intelligent citizen is the one who can see how things will turn out and then votes accordingly. Obviously this necessitates a type of education which is distinctly different from that appropriate for an autocracy. Education for intelligent behavior involves an understanding of causation which is not important in education for acquiescence to autocratic dictation.

Citizens can exercise the right of suffrage intelligently *only* when they have solved the problems which suffrage concerns. Blind, unintelligent voting interferes with the function of government in a democracy. Political-machine control of dumb voting is not democracy; it is camouflaged autocracy. Democracy can exist only when citizens solve the problems on which they must vote without the indoctrinating influence of political machines. Problem-solving ability is a fundamental prerequisite for good democratic citizenship. . . .

If we should preserve the democracy in America, it is obvious that our educational institutions must train our future citizens in the process of solving problems of democratic citizenship. We must teach our pupils to perform all the steps of the problem-solving process so that they can vote intelligently. Any system of education which merely "furnishes the mind with knowledge"

<sup>19</sup> From J. Stanley Gray, "Is American Education Appropriate for America?" *Educational Administration and Supervision*, April, 1935, pp. 309-310; 314-317.

is not adequate preparation for citizenship in a democracy. Mere fact teaching prepares students for only one of the six steps in problem-solving.

There are certain basic principles for education in a democracy which must be carefully observed if education is to train students to solve problems.

(1) *Children learn to do only by doing.*—This principle is so obvious that it need only be mentioned. Boys learn to play football only by playing football. Girls learn to play the piano only by playing the piano. Both learn to solve problems only by solving problems. "Whatsoever ye sow, that shall ye also reap."

However, traditional educators do not observe this principle. They apparently assume that children can learn to be autonomous citizens *without* any practice. The traditional school gives attention to only one step in the complete process of problem-solving—that of amassing data. Children are trained to memorize facts but they are not trained to know what to do with those facts. They are not stimulated to solve problems. In fact, they are even forbidden to solve certain problems. American children are educated in a manner appropriate only for citizenship in an autocracy. They do not learn to become democratic citizens by being trained in the practice of democratic citizenship.

(2) *Problems of school life must be significant to the child of that age.*—Fourth grade pupils cannot be expected to become enthusiastic about, nor profit much from, the solution of problems concerning public utilities, freedom of the seas, or the convention method of nominating presidential candidates. Pupils are best prepared for solving problems of adult living by solving problems of child living. They learn to live adult lives adequately by learning to live child life adequately. Dewey says, "If the environment, in school and out, supplies conditions which utilize adequately the present capacities of the immature, the future which grows out of the present is surely taken care of."\* If the school is organized on a democratic basis and children are required to solve problems of democratic school living, they will thus naturally be prepared for adult democratic citizenship.

(3) *Indoctrination has no value in training for good democratic citizenship.*—Permanent progress comes only when the people progress. Propaganda reform is temporary because the people do not know why the reform is good, and in a democracy the people have final authority. They can vote out reform as well as vote in reform. Public school administrators have often learned this to their sorrow. They have instituted reforms without educating the taxpayers (through parent-teacher meetings, visiting days, etc.) and as a result the people have elected new boards of education to abolish the reform and discharge the administrator. When the people have the power of suffrage, they must be educated to reform. They must understand why the new is better than the old. Indoctrinated ideas are never lasting. They do not stand the test of careful inspection. When adequate data are available, careful thinkers are seldom fooled long by indoctrination. Individual thinking (problem-solving) cannot

\* John Dewey, *Democracy and Education*. Macmillan, 1916, p. 65.

be prohibited by forbidding taboos. Religious leaders are beginning to learn this fact. Governmental leaders should learn it. Educators *must* learn it. It is only pseudo and temporary allegiance which is formed by command.

If the above discussion constitutes good reasoning, we are then forced to the conclusion that American education is not appropriate for America. Our educational procedure is fundamentally inconsistent with the demands of democracy. We are not educating our children for democratic citizenship but for autocratic citizenship. We are teaching them to accept the thinking of others instead of how to think for themselves. American education today is indoctrinating our children to believe that our half-solved problems and inadequate customs should be preserved and that virtue lies in respect for tradition. American school children are being taught to honor and almost worship the errors which we and our forefathers have made in our attempts to practice a type of citizenship for which we were not trained. We jealously guard our children from suggestions of reform and even force them to take oath that they will honor, cherish, and obey some of our mistakes.

Certainly it is time for American educators to allow themselves to be affected by the now prevalent attitude of reform. We, too, must recognize that this is the age of *tested* thought. The untested hypotheses of our ancestors must be considered for what they are worth in light of our modern techniques of experimental evaluation. We educators must not resist reform, but instead must become leaders in reform.

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## EXERCISES

1. Read Chapter X in Watson's *Behaviorism* (or Chapter V in the same author's *Ways of Behaviorism*) and evaluate the author's general thesis.
2. What is meant by *implicit* or *subvocal* thinking?
3. Compare the relative worth and accuracy of the three analyses (given in this chapter) of the thinking process as they apply to specific instances of problem-solving.
4. What conclusion do you make regarding the value of the public school in teaching children to think?
5. In which steps of the thinking process is intelligence significant? How has this study of thinking affected your understanding of intelligence?
6. In which steps of the thinking process may experience in solving one problem have transfer value in solving subsequent ones?
7. Analyze a specific problem in some vocation according to the steps in thinking.
8. Analyze a specific problem in mental hygiene according to the steps in thinking.
9. Analyze a specific problem in voting on some issue according to the steps in thinking.
10. Explain the function of language behavior in each step of one of the above examples in problem solving.



11. To what extent was trial-and-error behavior involved?
12. Consider Köhler's experiments\* with ape problem-solving. Which steps did the apes omit? What is the fundamental difference between human and ape problem-solving.
13. Compare the procedure of problem solving with that of the so-called "scientific method."
14. To what extent do objective tests measure one's ability to think or to solve problems? Can you think of a testing technique which would measure this more effectively?
15. How is problem-solving as analyzed in this chapter related to inductive and deductive reasoning processes?

\* See Köhler, Wolfgang, *The Mentality of Apes*. New York: Harcourt, Brace and Company, 1927.

## CHAPTER XIV

### PSYCHOLOGY OF ELEMENTARY SCHOOL SUBJECTS<sup>1</sup>

G. T. Buswell, *University of Chicago*

#### I. Introduction

The literature on the psychology of school subjects has developed very unevenly. For such subjects as reading, arithmetic, and handwriting a large number of scientific studies have been published in which detailed analyses have been made of the mental processes involved. Much of the work on these subjects has been experimental, and the body of data which now accrues is substantial. For some of the school subjects few experimental data exist and the literature is characterized by a considerable degree of speculation.

Partly because of variations in the character of the literature and partly because reading and arithmetic are so basic in any scheme of education, a greater amount of space is given to them here.

As far as possible the editor of this chapter has selected readings which throw light on the character of mental activity during the process of learning, rather than readings which deal with the outcomes of learning or describe and measure the end products of learning.

#### II. Reading

Reading, more than any other subject, has benefited from laboratory experimentation. The three references presented give (a) some idea of reading in schools before the influence of laboratory studies, (b) an illustration of one type of laboratory technique, and (c) a statement representing a modern view of the psychology of reading.

##### 1. EARLY CONCEPTS OF READING<sup>2</sup>

*Horace Mann*

Entertaining views of the importance of this subject, of which the above is only the feeblest expression, I have devoted especial pains to learn, with

selections included in this chapter illuminate many of the topics mentioned above. Students wishing to go into much more detail should read Cole's *Psychology of the Elementary School Subjects*, and similar texts by the Garrisons, Reed, Freeman, Wheat, LaRue, and Freeman. This chapter of readings can be used in connection with discussions in many of the standard texts, such as the following: Skinner and Collaborators, *Educational Psychology*, Chapter XIV; Jordan, *Educational Psychology*, Chapter V; Powers and Uhl, *Psychological Principles of Education*, Chapter XI; Sandiford, *Educational Psychology*, Chapters XVI and XVII; Monroe, *et al.*, *Educational Psychology*, Chapter XII; Wheeler and Perkins, *Principles of Mental Development*, Chapters XXIV and XXV; Hines, *Educational Psychology*, Chapter VII; Starch, *Educational Psychology*, Chapters XVI and XXII; Pintner, *Educational Psychology*, Chapter X, and Cameron, *Educational Psychology*, Chapters XIX, XX, XXI, and XXII.

<sup>2</sup> From Horace Mann, "Second Annual Report of the Secretary of the Board of Education, 1838," in *Life and Works of Horace Mann*, Vol. II. Boston: Lothrop, Lee & Shepard Company, 1891, pp. 521-522, 531-532.

some degree of numerical accuracy, how far the reading in our schools is an exercise of the mind in thinking and feeling, and how far it is a barren action of the organs of speech upon the atmosphere. My information is derived, principally, from the written statements of the school committees of the respective towns—gentlemen who are certainly exempt from all temptation to disparage the schools they superintend. The result is that more than eleven-twelfths of all the children in the reading classes in our schools do not understand the meaning of the words they read; that they do not master the sense of the reading lessons, and that the ideas and feelings intended by the author to be conveyed to, and excited in, the reader's mind, still rest in the author's intention, never having yet reached the place of their destination. And by this it is not meant that the scholars do not obtain such a full comprehension of the subject of the reading lessons, in its various relations and bearings, as a scientific or erudite reader would do, but that they do not acquire a reasonable and practicable understanding of them. It would hardly seem that the combined efforts of all persons engaged could have accomplished more in defeating the true objects of reading. . . .

The general practice is founded upon the notion that the learning of letters facilitates the correct combination of them into words. Hence children are drilled on the alphabet until they pronounce the name of each letter at sight. And yet, when we combine letters into words, we forthwith discard the sounds which belonged to them as letters. The child is taught to sound the letter *a* until he becomes so familiar with it that the sound is uttered as soon as the character is seen. But the first time this letter is found, even in the most familiar words, as in *father, papa, mamma, apple, peach, walnut, hat, cap, bat, rat, slap, pan*, etc., etc., it no longer has the sound he was before taught to give it, but one entirely different. And so of the other vowels. In words, they all seem in masquerade. Where is the alphabetic sound of *o* in the words *word, dove, plough, enough, other*, and in innumerable others? Any person may verify this by taking any succession of words, at random, in any English book. The consequence is, that whenever the child meets his old friends in new company, like rogues, they have all changed their names. Thus the knowledge of the sounds of letters in the alphabet becomes an obstacle to the right pronunciation of words; and the more perfect the knowledge, the greater the obstacle. The reward of the child for having thoroughly mastered his letters is to have his knowledge of them cut up in detail by a regular series of contradictions just as fast as he brings it forward. How different, for instance, is the sound of the word *is* from the two alphabetic sounds, *i* and *s*; of the word *we*, from the two sounds *w* and *e*; of the word *two*, from the three sounds, *t*, *w*, and *o*. We teach an honest child to sound the letters, *e*, *y*, *e*, singly, until he utters them at sight, and then, with a grave face, we ask him what *e-y-e* spells; and if he does not give the long sound of *i*, he is lucky if he escapes a rebuke or a frown. Nothing can more clearly prove the delightful confidence and trustfulness of a child's nature than his not boldly charging us, under such circumstances, with imposition and fraud.

2. SIGNIFICANCE OF EYE MOVEMENT STUDIES<sup>3</sup>*G. T. Buswell*

The use of eye movement records in the analysis of reading rests primarily upon the fact that they furnish an objective symptom of the character of the reading process. Unless the attention of the reader is specifically directed to them he is entirely unconscious of their nature. Consequently, a photographic record of eye movements is based upon a reaction which cannot be consciously modified to suit the occasion of a test. It is as difficult to modify directly one's eye movements while reading as it is to modify purposely the character of one's habitual gait in walking. A person walks in one manner when hurrying to catch a train, in another when strolling through the park, and perhaps in a still different manner when stepping to the speaker's desk upon a platform when a thousand eyes are focused upon him. His manner of walking is the unconscious expression of his whole nervous condition under such circumstances, a symptom of the purpose dominating his action. . . . In a similar fashion a person's eye movements furnish an index of the general nature of his reading process, a symptom of the stage of maturity of his reading habits. When we see a person making an average of twenty fixations per line in reading, we know that he is not grasping the meaning easily or rapidly. In like manner, when we observe a person making an average of four fixations per line, we know that he is either reading superficially or has reached a mature stage of reading. The making of only four eye fixations does not cause maturity of reading; maturity causes the making of only four fixations per line. Eye movements are effects, symptoms; but they are symptoms because they are themselves necessary phases of the process and hence very fundamental elements of reading. . . . The character of the eye habits is radically affected by reading varied types of material, the eye behaving differently when the material read is simple fiction than it does when the material is taken from an algebra or a rhetoric textbook. When the characteristic eye movements are known, therefore, one may gain some idea of the relative difficulty of different kinds of material for given individual. Likewise, a change in the purpose of reading is reflected by the eye movements. During serious, careful reading such as occurs in the study process the number and duration of the fixations are increased.

3. MENTAL PROCESSES IN READING<sup>4</sup>*Charles H. Judd*

An important educational problem has been raised by the studies of reading which have been carried on during the past two decades. It is the common practice of present-day schools to teach beginning reading by introducing the

<sup>3</sup> From G. T. Buswell, "Fundamental Reading Habits: A Study of Their Development." *Supplementary Educational Monographs*, No. 21, June, 1922, pp. 8-9.

<sup>4</sup> From Charles H. Judd, *Education as Cultivation of the Higher Mental Processes*, 1936, pp. 185-190. By permission of The Macmillan Company.

pupils first to words rather than to letters. There is general recognition of the fact that it is unpsychological to drill primary pupils on the isolated letters of the alphabet and on meaningless combinations of letters such as were universally taught as late as the middle of the nineteenth century. The method of beginning with words in primary reading is justified by the fact that even a child can grasp in a single act of perception a meaningful group of letters such as make up a word. This fact was long ago demonstrated by laboratory experiments which determined the complexity of mental activities by measuring the reaction time.

The word method of teaching reading has certain limitations. Anyone who has heard a pupil in the second or third grade stumbling through a reading exercise, pronouncing each word staccato and giving every evidence of failure to relate the words and interpret them as interdependent elements of a sentence, has been in the presence of a striking illustration of the fact that there are dangers in the plan of teaching reading which emphasizes words rather than larger and more inclusive units of expression.

Recognizing the unsatisfactory results of undue emphasis on words in the teaching of reading, some teachers and some authors of school readers have advocated a method which gives instruction from the first in the interpretation of a whole story. This method of teaching primary reading begins by familiarizing pupils through oral rehearsal with the story to be read. Pupils in the primary grades and even in the upper grades have a command of oral language which is far superior to their ability to read written or printed materials. The use of oral language in preparing for the reading lesson is, therefore, an appeal to a well-established power.

When the story to be read is entirely familiar to the pupils through oral repetition, the teacher has the pupils open their books and read. A difficulty arises at this point because some pupils refuse to pay serious attention to the printed words and are content merely to recite the story, which they have learned by heart from the oral repetition. How far pupils go in mere recitation of the story rather than true reading has been demonstrated by photographing the eyes of pupils being taught by the method here under discussion. The eyes of some pupils wander over the page in what appears to be a wholly aimless fashion. Evidently, the general arrangement of the printed matter or the illustrations are enough to make repetition of the story possible.

Pupils who are being taught to read by the method of preliminary oral preparation are likely to show a defect exactly opposite to that shown by pupils being trained to concentrate on individual words. Because the pupils being trained through oral preparation know the story as a whole, they are irked by the demand that they pay attention to words.

Not only do the two methods of teaching reading, that which emphasizes words and that which emphasizes an understanding of the story as a whole, give rise to difficulties in reading, but both methods are likely to leave pupils without ability to spell. Correct spelling of words depends on detailed knowledge of the letters that compose the words. A pupil who recognizes words by

their gross configurations is frequently very hazy about the appearance of the middle of a word. Spelling requires knowledge of letters. Reading requires the combination of words into phrases and sentences.

There is an endless conflict between demands of the type imposed by spelling and those of the type imposed by reading. Many individuals who learned to read in early childhood by becoming acquainted with words do not pay attention to letters. They go through life incompetent in spelling and often incompetent in oral reading, which in some measure requires analysis of words into syllables. On the other hand, there is a very large number of individuals who were so carefully drilled in school in attention to syllables and words that they have never gained the power of fluent reading, which requires the ready combination of words into phrases and sentences. They left the schools with clumsy habits of reading. The process of dealing with the printed page is so laborious for those who have been trained in minute analysis that they do little or no reading in later life, thereby supplying the most impressive evidence that their school training was not successful.

The antithesis between analytical attention to details and synthetic grasp of large units appears at levels far above the primary grades. There are a great many adults who, when they read a book, often puzzle over a sentence the meaning of which they find obscure. Not infrequently the sentence would be cleared up if the reader had the courage to go ahead and finish the paragraph or chapter, leaving the troublesome sentence to be interpreted in the light of the context supplied by the later reading matter. It is wholesome advice to readers to urge them to go rapidly through some large unit, such as a chapter or even a whole book, if it is an exposition of a difficult theme, and later to return and make a careful study of particular sections and sentences. Here, as throughout the course of education, the problem to be solved is the problem of securing a broad, general view, a frame of reference, in which particular items will take their places and fit into their proper relations. If the mind does not arrive by some means at the larger view, the thinking will be circumscribed and petty. On the other hand, if the details are not clear, the thinking is likely to be loose and ill organized. The trained individual must have both the ability to master details and the mature power to synthesize details into comprehensive units of a higher order. A landscape, to appeal once more to an illustration presented earlier, will be fully seen and appreciated only when analysis and synthesis have both refined the first, general view. Synthesis is a higher, more mature type of experience than is observation of details, but the highest type of synthesis must include clearly recognized details.

A number of recent investigations have proved that proper reading habits are indispensable for successful pursuit of secondary school and college studies. Many an advanced student who is required to read and comprehend long assignments falls behind in his work because of the difficulties which he encounters in reading. The teacher who has never made a study of the psychology of reading assumes that the student who thus falls behind is unable to grasp the ideas involved in a mastery of the subject. The teacher records a

failure in history, physics, or some other subject when in reality the failure was in reading.

Scientific studies of reading make it clear that there are many different types of reading. The reading of problems in algebra, where attention to details is imperative, is totally different from fluent reading of narrative prose. Reading when one is preparing to answer questions dealing with rhetorical structure, historical implications, or involved interpretations is very different from free reading to satisfy one's curiosity.

### III. Arithmetic

Since 1910 the subject of arithmetic has been characterized by an extensive application of the "drill theory." However, beginning about 1930 numerous attempts have been made to inject "meaning" into the subject, as illustrated by the following reference.

#### I. PSYCHOLOGICAL THEORIES ON TEACHING ARITHMETIC<sup>5</sup>

*William A. Brownell*

Within the "meaning" theory the virtues of drill are frankly recognized. There is no hesitation to recommend drill when those virtues are the ones needed in instruction. Thus, drill is recommended when ideas and processes, already understood, are to be practiced to increase proficiency, to be fixed for retention, or to be rehabilitated after disuse. But within the "meaning" theory there is absolutely no place for the view of arithmetic as a heterogeneous mass of unrelated elements to be trained through repetition. The "meaning" theory conceives of arithmetic as a closely knit system of understandable ideas, principles, and processes. According to this theory, the test of learning is not mere mechanical facility in "figuring." The true test is an intelligent grasp upon number relations and the ability to deal with arithmetical situations with proper comprehension of their mathematical as well as their practical significance.

There is room, also, in the "meaning" theory for certain features of the theory of incidental learning. The "meaning" theory allows full recognition of the value of children's experiences as means of enriching number ideas, of motivating the learning of new arithmetical abilities, and especially of extending the application of number knowledge and skill beyond the confines of the textbook. But the efficacy of incidental learning for developing all the types of ability which should be developed in arithmetic is held to be highly doubtful by advocates of the "meaning" theory. . . .

According to the "meaning" theory the ultimate purpose of arithmetic instruction is the development of the ability to *think* in quantitative situations. The word "think" is used advisedly: the ability merely to perform certain

<sup>5</sup> From William A. Brownell, "Psychological Considerations in the Learning and the Teaching of Arithmetic," in *The Tenth Yearbook of the National Council of Teachers of Mathematics*, 1935, pp. 19-20; 28-29. Bureau of Publications, Teachers College, Columbia University.

operations mechanically and automatically is not enough. Children must be able to analyze real or described quantitative situations, to isolate and to treat adequately the arithmetical elements therein, and to make whatever adjustments are required by their solutions. When the purpose of arithmetic instruction is defined in the above terms, true arithmetical learning is seen to be a matter of growth which needs to be carefully checked, controlled, and guided at every stage. It cannot safely be presumed that children can themselves find and follow the most advantageous course of development. On the contrary, the responsibility for sound and economical growth rests squarely upon the teacher.

In meeting this responsibility the teacher is unwise who measures progress purely in terms of the rate and accuracy with which the child secures his answers. These are measure of efficiency alone, not of growth. It is possible for the child to furnish correct answers quickly, but to do so by undesirable processes. The true measure of status and of development is therefore to be found in the level of the thought process employed.

## 2. THE PROCESS OF COUNTING<sup>6</sup>

*Harry Grove Wheat*

The kinds of mistakes a beginner makes in learning to count indicate the phases of the process of counting. (1) Sometimes the number name is forgotten, or the names are used in the wrong order. The child counts, *one, two, three, four, five, six, eight, nine, ten, twelve, eleven*. (2) Sometimes the child fails to recognize the point where he last looked in his counting and so becomes confused. The adult often makes this error, especially when the objects are very similar or very close together. The failure here is one of discrimination. (3) Sometimes the number names and the discriminated objects are not properly matched. The eye runs ahead of the voice, or lags behind, and confusion results. (4) Sometimes the individual object is mistaken for the group. The child counts the ten fingers, stopping on the thumb of one hand. When asked, "How many?" (holding up and pointing to the thumb) he says, "Ten." He does not recognize that the name *ten* belongs to the tenth object counted only when it is thought of as a group which includes all the objects previously counted.

When one counts the cars in a procession, for example, he does not merely say the number names, nor does he merely look at, or point to, or nod to each individual car. He does both, i.e., he gives the appropriate number name to each car, and he does both at once. If he is careless in distinguishing the cars, he does not know when to cease giving the number names. If he distinguishes each car, but becomes mixed in giving the names, he counts inaccurately. Giving the number name and discriminating the individual car to which the name belongs must be done together.

<sup>6</sup> From *The Psychology of the Elementary School*, copyright, 1931, by permission of the author, Harry Grove Wheat, and the publisher, Silver Burdett Company, pp. 128-130.



When one counts he does not study the qualities of the objects counted; he determines their quantity. To do this he at once thinks all the objects counted as belonging together in a group, and distinguishes each object from every other. The double act of grouping and discrimination is accomplished through an orderly and systematic reaction on the part of the individual. He resorts to pointing, or to nodding the head, as a means of discrimination, and he applies the series of number names which serves both to record his discrimination of each object in turn and to place it in a group with the objects previously counted.

Training in counting thus includes: (1) Training in the orderly use of the number names. The names must be learned as a series. (2) Training in discriminating individual objects. (3) Training in relating the number names and the discriminated objects, that is, practice in the actual counting of objects. Such practice made in response to such questions as, "How many (here in this group)?" calls attention to groups, and gives (4) training in grouping.

As a result of his activities in counting, the primary grade child acquires some notion of groups. The idea of a group differs from the idea of the individual objects of which it is composed. Counting six objects, for example, speaking of them as *six*, recognizing and writing 6 to stand for the group serve to concentrate attention upon the group rather than upon the objects individually. Having practiced the various counting activities until he has attained some proficiency in counting, the child is ready to use counting in enlarging his ideas of groups.

### 3. THE PSYCHOLOGICAL FUNCTION OF ARITHMETIC <sup>7</sup>

*Leo J. Brueckner*

Number may be thought of as a method of thinking. The scientist thinks with precision because he has devised ways of expressing his concepts quantitatively and compactly by means of number. Order, arrangement, and precision characterize his methods of thinking. The concepts of the savage are vague and indefinite since he has not developed a basis of expressing them quantitatively or in an orderly manner. He has no way of expressing relationships clearly because he lacks the techniques that have been invented for stating these relationships simply, such as ratio, averages, medians, modes, correlations, and similar statistical devices. Such terms abound in books, newspapers, and magazines. To read intelligently the reader must have a true appreciation of their functions.

The frequency table and the correlation table have provided methods by which a large number of facts may be organized and interpreted. Graphs and diagrams help to present the facts in convenient form. The pupil should learn to read and to construct the simple forms of graphs found in his reading and

<sup>7</sup> From Leo J. Brueckner, "A Critical Evaluation of Methods of Analyzing Practice in Fractions," in *The Twenty-Ninth Yearbook of the National Society for the Study of Education*, 1930, pp. 691-692. Quoted by permission of the Society.

to sense their limitations. The modern basis of insurance and of many other forms of investment is the statistical organization and interpretation (often with the aid of the mathematics of probability) of a vast amount of quantitative data. Arithmetic can contribute much to the development of a realization of the utility and importance of commonly used statistical and graphic devices.

The concepts of ratio and proportion are methods of thinking which can only be developed by their repeated application in concrete situations in which they function. They cannot be developed merely as abstract notions.

A recognition of the value of accurate quantitative information as a basis for forming judgments and making decisions should result from the repeated consideration and weighing of such facts in the solution of problems of concern to the individual or group. The ability to recognize the limitations of data and to evaluate them is an important aspect of quantitative thinking in reading which has often been overlooked as a desirable outcome of arithmetic instruction.

#### IV. Spelling

The following reference is an example of the application of one of the techniques of experimental psychology, namely, photographing eye movements, to the subject of spelling. The complete monograph, from which this reference is abstracted, presents an interesting example of a scientific analysis of one kind of learning.

##### CHARACTERISTICS OF GOOD AND POOR SPELLERS<sup>8</sup>

*Luther C. Gilbert*

The average number of fixations employed in the study of spelling is less for the good spellers than for the poor spellers in every grade. Good spellers tend to decrease their average number of fixations from grade to grade. Poor spellers exhibit an irregular tendency to increase their number somewhat during the elementary school period; after the freshman year of high school there is a sharp, though irregular, decline.

The average study time per word is greater for the poor spellers than for the good spellers at every level. Study time for good spellers shows a more or less regular grade to grade decrease. For the poor spellers there is an irregular tendency to increase the time during the latter years of the elementary school; after the freshman year there is an irregular decrease.

The average time per fixation is greater for the poor spellers than for the good at every level. Both good and poor spellers exhibit a tendency to decrease the fixation time from grade to grade through the school period.

Fixation pause lengths are more regular for good spellers than for poor spellers, and become increasingly regular with progress through the grades. The increased uniformity is attained by the elimination of the very long pauses.

The study unit of the good spellers is broader than that of the poor spellers

<sup>8</sup> From Luther C. Gilbert, "An Experimental Investigation of Eye Movements in Learning to Spell Words." *Psychological Monographs*, 43, No. 3, 1932, pp. 77-80.

at every level. An irregular increase in breadth characterizes the grade to grade development for both good and poor spellers. For the poor spellers the increase in span is very slight, for good spellers it is very rapid with respect to words of the same difficulty.

At every level good spellers use fewer regressive movements than do poor spellers. The progress of the good spellers through the grades is accompanied by a slight decrease in the number of regressions. For the poor spellers growth is very irregular during the elementary period; after the freshman year of high school there is evidence of a decrease. . . .

Efficient procedure of individuals who find words easy varies with the degree of maturity. Young learners beginning spelling explore the word minutely. Increased familiarity with letter combinations results. The principle of fusion or synthesis operates so that recognition proceeds with increasing speed, regularity, and width of span. But some letter combinations become familiar before others. Typically the good speller learns to differentiate between easy and hard sections. Easy sections are dismissed with little more than a mere identification reaction. Hard sections are analyzed for the purpose of clearing up the difficulties. . . .

In general, poor spellers fail to develop effective methods of analysis. They do not distinguish properly between hard and easy spots. Easy spots are apt to receive minute attention; hard spots may be ignored. The study is apt to be irregular, detailed, distributed without reference to the individual's needs.

The implications for education of the findings of the investigation here reported are direct. The teaching of spelling in the early years should involve a definite method of instruction. The instruction should aim primarily to develop a systematic method of attack upon words. The teaching procedure should take into account individual differences.

The practice of assigning a word or group of words to young pupils with the command to "study for five minutes," or to "study these words until you know them" is to be condemned not merely as inefficient, but as detrimental to the formation of proper habits of study. Unless the child has mastered a proper technique, such directions will, in all probability, lead to slow, detailed, repeated study without any guarantee of improved efficiency. Merely to increase the amount of study does not constitute a remedial measure for poor spellers. The proper approach lies through the development of a good type of analysis.

Different letter combinations are of varying degrees of difficulty. The pupil should be taught to distinguish between hard and easy combinations. The easy sections are those which he has mastered and accordingly require little attention; detailed exploration of such sections is undesirable and should be discouraged. The emphasis in study should be placed on the identification and analysis of those sections which are difficult. The amount of analysis should depend upon the extent of difficulty which the situation presents.

Letter combinations which are difficult for one individual may be easy for another. Obviously it is undesirable for the teacher to direct the special attention of the class to sections of the word which she thinks difficult or which

some of the pupils find difficult. Each pupil should be trained to detect and correct his own errors.

In so far as it is compatible with the efficient mastery of words, study should proceed as quickly as possible. Detailed study per se possesses no virtue. The proper development in spelling lies through the initial analysis of difficulties and the subsequent synthesis of the mastered elements. As an individual attains complete maturity with respect to words of a given level of difficulty he comes to recognize the word as an organized unit. To facilitate this process, to prevent lagging or uneconomical multiplication of effort, the employment of frequent check tests during learning is essential.

## V. Handwriting

The psychological studies of handwriting have been concerned mostly with analyses of the motor habits involved and with diagnosing specific difficulties by examining the product of writing. The reference below deals with the handwriting movement.

### THE NATURE OF HANDWRITING<sup>9</sup>

*Frank N. Freeman*

Previous laboratory studies have shown that the writing movement is a complex and delicate co-ordination. The thumb and the first two fingers exert continually varying degrees of pressure upon the penholder as the different strokes of the letters are produced. The movement of the fingers and of the hand and arm are combined in a complex manner. Some of these component elements of the movement are more prominent in some individuals, and others are more prominent in other individuals, but each element has its characteristic part to play. The formation of the letter is attended by a series of fine pressure changes of the pen upon the paper. As the writer acquires skill he comes to make particular letter forms with the characteristic pressure changes. The speed of movement of the pen is also continually changing, and these changes of speed are intimately adapted to the forms of the letters which are being written. A straight stroke increases in speed toward the middle and usually decreases toward the end. When the direction of the stroke is changed, the speed is reduced. Long strokes are made with greater speed than short strokes, with the result that strokes widely differing in length may be made in the same or nearly the same length of time. This is a manifestation of the disposition to rhythm which is characteristic of so many activities. The speed of a writing stroke is also affected by the complexity of the stroke itself and by the complexity of the strokes which follow it. Pen movements can be made more rapidly in some directions than in others. The direction of most rapid movement is from lower left to upper right and the opposite, and the direction of slowest movement is from upper left to lower right and the opposite. The conditions of writing should be so arranged that the movement from the

<sup>9</sup> From Frank N. Freeman, "The Handwriting Movement." *Supplementary Educational Monographs*, 2, No. 3, Whole No. 9, 1918, pp. 4-5.

lower left to the upper right is utilized. As a child grows older his writing becomes more rhythmical, the succeeding strokes follow one another more closely, and there is marked increase in the rapidity and accuracy of the writing movement.

## VI. History and Geography

The mental processes involved in the social and natural sciences, because of their complexity, have been difficult to analyze. Here the educational psychologist has found it necessary to borrow heavily from the data of general psychology.

### I. MENTAL PROCESSES IN STUDYING HISTORY <sup>10</sup>

#### *Harry Grove Wheat*

If the pupil in the later grades of the school is to participate in the activities which lead to an insight into the thoughts and feelings, ideas and emotions of the American people, and to a development of the story of America, the work of preceding grades must be so organized as to provide the necessary preparation for these activities. Consideration of the process of grasping historical development would indicate that the process is of late appearance in the intellectual life of the pupil. The processes of reasoning from cause to effect, of conclusion drawing, of generalizing from a body of data, and of studying particular phases of situations in the search of evidence relating to certain ideas and opinions would seem to require (1) the possession of a fund of information, and (2) the ability to organize it with respect both to (a) temporal and (b) causal relations.

The process of grasping historical development involves the ability to interpret; indeed, the process is one of interpretation. In the development of the story of America in the mind of the pupil, related events do not relate themselves automatically; the common element in a group of facts is not self-revealing; and the truth, or falsity, of a conclusion is not self-evident. Uninterpreted, historical facts are cold and lifeless things. They become living, moving forces to the extent that meaning is attached to them. As they are interpreted their relations become apparent, their common elements are revealed, and their fitness as sources of evidence to substantiate an idea becomes clear.

The type of imagination employed in interpreting past events is called the historical sense. Its operation may be described as follows: Past events may be interpreted in the light of past physical conditions and surroundings, and in the light of the motives and mental attitudes of the people who lived in the past. The significance of a historical fact is often understood through a knowledge of its physical setting, and its background of mental attitude makes clear its importance. The difficulty the pupil encounters in his attempts to put together the facts of history so as to form a reasonable and continuous story is to be explained by the tendency to make no allowance for the differences between past and present life.

Imagination may be described as the extension of experience. In terms of

<sup>10</sup> From Harry Grove Wheat, *op. cit.*, pp. 337-340.

this description we may explain the tendency to neglect the conditions of past life in the consideration of past events. When the pupil learns of the activities and experiences of the people of the past, he is inclined to place them in settings with which he is familiar and to clothe the historical personages to whom he is introduced in the attributes and with the characteristics of people of his acquaintance. Familiar scenes, familiar conditions, familiar activities, and familiar people, in varying orders and arrangements, are projected backward by the pupil and are made to explain the life of the past. Teachers have no difficulty in discerning that their pupils are more apt in explaining the past by the present than in explaining the present by the past.

The differences between past and present life must be learned. It will be impossible for the pupil to secure an appreciation of the sturdy character of the early Puritans unless he understands the hard conditions of their life and the sacrifices they had to endure. If he fails to get an insight into their motives, and is unable to see matters from their point of view, he will have small respect for their devoutness when he learns of the stern and cruel punishments they inflicted upon the ones who did not conform to their beliefs. Their attitude toward witchcraft is inconceivable in these times of comparative enlightenment. It is becoming increasingly difficult to understand how there could be any real difference of opinion over the question of slavery. The facts of the dispute over slavery do not explain the dispute. One must learn what conditions were back of the dispute and must gain some insight into the attitudes and motives of the people who lived at the time.

Closely akin to the historical sense, and in many respects one with it, is that type of mental process known as temporal imagination. In order to build up the story of America, one must not only learn about the various events of our history; one must also organize these events in time order. This does not imply by any means that events belong together in one's thinking merely because they happened at about the same time, nor that one event resulted from another merely because it followed it in point of time. It does imply that the ability to recognize the sequence of events often gives an insight into causal relations, and that a time sense is foundational for an understanding of the conditions and viewpoints of past life.

Pupils in the lower grades are lacking in any accurate sense of time relations. They cannot stretch their imaginations with accuracy back over long periods of time. Every event of the past has happened for them a "long, long time ago." They can go back in their memories only to their experiences in school last year and place them in proper relation to their experiences in kindergarten a year or two earlier.

A relatively accurate time sense develops with use. By going back in imagination day after day to the times and conditions and happenings of the past, the pupil learns to do it with greater and greater accuracy. The acquiring of a number language becomes gradually more helpful, and, if properly introduced, dates become as mileposts showing the progress of history or as convenient markers for keeping straight the sequence of events.

It is entirely proper to speak of "a relatively accurate time sense" developing with use. One's time sense never becomes absolutely accurate. Let the reader compare the duration of the past four years with that of his four years in college or his four years in high school, and consider which *seems* the longer period of time. Moreover, as one grows older the years seem to pass in greater haste. If the adult finds it difficult to organize his *actual* experiences in their exact temporal relations, it is unreasonable to expect the child to organize his *extended* experiences in a time order that is anything more than relatively accurate.

## 2. MAPS AND GLOBES<sup>11</sup>

*Frank N. Freeman*

Maps are symbols which are interpreted by the imagination. This practice will prepare the way for the child to form the idea of the relation of places to one another, even though he has not seen them together. This transition from sight to imagination is greatly facilitated by the use of maps. The child may draw his own map of a region which he sees from a high place, or the location of the places upon the map may be pointed out to him as he sees them from the eminence. The child is thus brought to the understanding of maps as signs or symbols of the relation of places to one another. When he has learned through this means what a map is for, and what it refers to, he is able to use a map as a means of guiding his imagination in understanding the relationship of places which are so distant that they cannot be seen at the same time.

It is possible to get only a very vague and rough idea of the location of widely separated places unless a map is used. Suppose that one should try to get an accurate idea of the relative location of three places by traveling from one to another. The three places might form the three apexes of a triangle. In order to form an accurate idea of their location, it would be necessary to keep in mind not only the direction in which one is traveling in going from one to another, but also the distances. If an error was made in either the distance or the direction, it would introduce an error into the notion of the positions of the places with reference to other places and with reference to one another. On the map, due to the fact that it is drawn to scale, the relative distances as well as the directions are represented to the eye. In attempting to get a clear notion of a region, one must either consult a map which has been made of it or make a map by means of compass and a measuring device. It is difficult for one who has been brought up to the early use of maps to imagine to himself the sort of orientation which a person would have who had never used maps; but it seems clear that a person who does not have the assistance of maps will require a much longer time to become oriented in a region than one who uses maps.

After the child has learned the meaning of maps by associating them

<sup>11</sup> From Frank N. Freeman, *The Psychology of the Common Branches*. Boston: Houghton Mifflin Company, 1916, pp. 171-173; 176-177.

with the regions with which he is familiar, he may learn to use them without referring directly to the actual world which is about him. It is not necessary that a person in planning a railroad journey shall at every moment think of the direction or the distances which are represented on the map as related to the place which he is occupying. He may be in one city and be planning a railroad journey which is to start from another city. In that case if he applies the map to the concrete world, it must be by imagining himself in the other place. It is very probable that we learn to use maps in a highly abstract way for such purposes, but, as in a great many other cases, the meaning of maps will be greatly restricted if they have not in the beginning been closely related to the actual world. It is, therefore, highly desirable that the child should begin by a study of the region in which he lives, and that he should learn the meaning of maps with reference to this region instead of beginning with a map and attempting afterward to apply it to the real world. . . .

A difficulty with the understanding of maps sometimes arises from regarding a certain side of a map as representing the wrong direction in the concrete world. By convention we use the top of the map to represent north. This association must, of course, be formed in the mind of the child. It is probable that if his attention is not called particularly to the matter he will naturally associate the directions on the map with the directions on the earth corresponding to it as it lies upon the desk. That is, if the child faces the east or even if the map is on the east wall, and nothing to the contrary is said to him, he will think of the top of the map as representing the east. We have no experimental facts on the matter, but observation by teachers seems to indicate that it is desirable at first, in order to form the proper association, that maps be placed so that the direction on the map corresponds to the direction on the earth. As the child becomes more accustomed to the use of maps, he can readjust his position in imagination, but at first the connections between the symbols and the facts is somewhat difficult for him to make at the best, and it should be made as easy as can conveniently be done. For this purpose maps which are drawn upon the earth itself—for example, a map of the schoolyard made upon the playground or in the sand-box—is the type of symbol which can be most easily associated in the mind of the child with the fact which it represents, and this is the step which is the most natural to take first.

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## EXERCISES

1. Contrast the mental processes in reading when oral reading rather than silent reading is emphasized.
2. From observing eye movements what evidence can a teacher gain that will help her to understand how children read?
3. What are some different types of reading?
4. How would a use of the drill theory as contrasted with a meaning theory affect a child's understanding of the number system?
5. Show the stages by which a child learns the abstract nature of number.
6. To what extent do you think computational arithmetic is used among adults in comparison with informational arithmetic?
7. Try to formulate a series of psychological principles affecting the teaching of spelling.
8. What do you consider the important elements which make up the handwriting movement?
9. Show how generalization is an important mental process in studying social science.
10. How would you proceed from concrete to abstract in teaching children to use a map?

## CHAPTER XV <sup>1</sup>

### PSYCHOLOGY OF SECONDARY SCHOOL SUBJECTS

*A. M. Jordan, University of North Carolina*

#### I. Introduction

The principles of the psychology of learning apply without doubt to the learning of the school subjects. Too frequently, however, either because the psychologist is unacquainted with the details of the special field involved or because the teacher of the special subject is likewise handicapped in the field of psychology, sufficient illustrations of the application of the principles of learning to actual classroom procedures are lacking. It is the purpose of this chapter, therefore, to present such illustrations not only from the fields of mathematics, the languages, the social sciences and the natural sciences but also from the fields of art and poetry. The division of learnings into types is useful. The types are not to be taken too seriously. They are best thought of as foci of emphases with much overlapping between types rather than as mutually exclusive compartments.

#### II. Acquisition of Habits, Skills and Information

##### I. IN FOREIGN LANGUAGE <sup>2</sup>

*C. H. Judd*

A child picks up without the slightest difficulty methods of making sounds, because he has no settled habits which interfere with his imitating whatever he hears. On the other hand, those who come late in life to a study of a foreign language are slow to acquire correct pronunciation because of the interference with correct articulation which results from their earlier habits. To be explicit, a mature American has learned to pronounce his *w's* and *r's* in a certain way. If he is asked to pronounce these letters as they are sounded in French or German, he is handicapped by the established habits of his earlier life. He will have to go through a long drill to learn the new pronunciations. In fact, it is a well-known characteristic of foreigners in all

<sup>1</sup> This chapter of readings can be used profitably in connection with the following general texts in educational psychology: Skinner and Collaborators, *Educational Psychology*, Chapter XIV; Jordan, *Educational Psychology*, Chapter VIII; Powers and Uhl, *Psychological Principles of Education*, Chapter XI; Monroe, *et al.*, *Educational Psychology*, Chapter XIII; Mursell, *Psychology of Secondary School Teaching*, Chapters V, VI, VII and VIII; Hines, *Educational Psychology*, Chapter VII; and Cameron, *Educational Psychology*, Chapters XIX, XX, XXI and XXII. Several books have been written which deal with this entire field or some part of it. Among these are the following: Judd, *Psychology of Secondary Education*; Garrison and Garrison, *Fundamentals of Psychology in Secondary Education*; Mursell, *Psychology of Secondary School Teaching*; Pechstein and Macgregor, *Psychology of the High School Pupil*; and Thorndike, *Psychology of Algebra*.

<sup>2</sup> From C. H. Judd, *Psychology of Secondary Education*. Boston: Ginn and Company, 1927, pp. 243-244.

countries that they speak with a certain imperfection in the sounds which they attempt to employ. Recent investigations have thrown much light on one group of difficulties encountered by pupils; they have demonstrated the fact that the methods of using the speech organs are very different among those who speak the Romance languages and those who speak the Teutonic languages. The Teuton glides from sound to sound and from pitch to pitch, while the user of a Romance language speaks in sharply differentiated, staccato utterances. The types of behavior in the two cases are markedly different. The use of the tongue and teeth and lips differs so much that the individual trained in one mode of articulation seldom acquires an accent-free pronunciation in a language of the other type.

What is true of pronunciation is undoubtedly true also of those habits of expression which are developed in the mastery of one's vernacular. The form of a sentence, for example, which has become familiar through the vernacular will constantly arise in a pupil's mind when he attempts to deal with the sentence structures in a foreign language. There is no escape from these complications when mature individuals study a foreign language. Even the degree of maturity attained by high school pupils must be taken into account by teachers of foreign languages.

## 2. IN ALGEBRA<sup>3</sup>

*E. L. Thorndike*

Modern psychology, however, is suspicious of all cases where habits are supposed to be easily derived from principles. It so often happens that the really effective principle is the product of the habits, not their producer. A man's conduct seems to determine his conscience more than his conscience his conduct. Principles are not, as a rule, general but rather are limited to the fields where they have had habitual operation. Young notes that pupils asked

to find the value of say,  $e$  in  $a = 1.4b + \frac{c}{e}$ , will proceed to "Let  $x = e$ ; then

$a = 1.4b + \frac{c}{x}$ , etc." In the learning of arithmetic in the common schools

the understanding of how and why to carry in adding, to manipulate the partial products in multiplication, to place the decimal point, and the like, seems to come to many pupils only after they have done these things many times. Many of them learn to operate by imitation, in the first instance, the general statements of how and why being little more than nonsense words to them, and acquire their understanding of the general statements by first acquiring habits which the general statement describes or justifies.

There is, of course, a better chance for learning by grasping a principle or rule and applying it so as to form certain habits, in the case of high school pupils than in the case of pupils in general; and in the case of algebra than

<sup>3</sup> From E. L. Thorndike, *Psychology of Algebra*, 1923, pp. 245-246. By permission of The Macmillan Company.

in the case of, say, a foreign language. The high school pupils are, with few exceptions, from the top two-thirds of the population for abstract intellect. The operations in algebra are clearly and fully describable, and the reasons why one should operate in such and such ways are rather easily seen and appreciated.  $a^m \times a^n = a^{m+n}$  and  $(a^m)^n = a^{mn}$ , for example, are perhaps as teachable as any rules found in all secondary teaching.

Nevertheless we maintain that the pupil learns the rules of algebra by operating as truly as he learns how to operate by being taught the rules. We maintain, for example, that the information (even by mere imitation and unthinking acceptance) of special habits like  $a^2 \times a = a^3$ ,  $a^2 \times a^2 = a^4$ ,  $a^2 \times a^3 = a^5$ ,  $b^2 \times b = b^3$ , etc., is a natural and useful step toward learning the general modes of multiplying. The pupil builds up or integrates his habits into rules, as well as derives new habits from rules. Learning to compute algebraically is not only, or chiefly, learning rules and how to apply them; it is also building a hierarchy of habits or connections or bonds which clarify, reinforce and, in part, create the understanding of what the rules mean and when to apply them.

### 3. IN ENGLISH COMPOSITION <sup>4</sup>

*Lucia B. Mirrielees*

Aside from board work chosen from student themes, how are pupils to get enough practice so that they will begin to be critical of their own sentences? You will have to work out many exercises. Unfortunately ideas penetrate slowly, and the biblical admonition "Line upon line, and precept upon precept: here a little and there a little" applies nowhere more appropriately than to the teaching of composition. A pupil sees that "He saw him then" is perhaps bettered by the change "Then he saw him." He grasps the idea so clearly that when called on for another sentence, he can make this one, "John saw her then," and change it triumphantly to "Then John saw her." But in his own themes he will continue to write one after another subject-verb sentences—"I went there later"; "He confessed it all to me afterwards"—with no realization of the fact that monotony of form could be avoided by transposition.

*What are you to do?* You may give out twenty sentences to be changed so that each begins with either an adverb or a prepositional phrase. You may praise highly a revised sentence set amid a flock of subject-verb sentences. You may read a theme composed of monotonous subject-verb sentences with malign emphasis, such emphasis that the class will squirm in anticipation of conclusively damning it. And, by the way, you will find that your pupils are much more censorious than you would ever dare to be. Often you will be forced to moderate their criticism, to plead that though of course the form *is* bad, yet the idea is a good one; that though repetition weakens the thought, yet some verb is well used. As soon as possible it is well to rouse your class

<sup>4</sup> From *Teaching Composition in High School*, by Lucia B. Mirrielees, copyright, 1931, by Harcourt, Brace and Company, Inc., pp. 51-52.

so that they condemn and you willingly admit the evils of construction. Why? For two reasons. First, the offender who perpetrates a bad theme heeds the criticism of his peers much more than he will ever take to heart your own comments; and second, he will be grateful for your championship and your sympathy. You admit that the dress of his thought is outlandish, but you approve his thought. He and his companions, however, must be reminded of one thing. A simple subject-verb sentence is often the best type to use; it is only monotonous repetition of the same kind of sentence that is tedious. A monotonous series of sentences beginning with adverbs or prepositional phrases would be even more undesirable, because less natural. Monotony, then, is the crime that your pupils must realize and, having realized, must attempt to eradicate from their themes. And how are they to realize it? Through reading themes aloud softly, listening to each sentence.

### III. Learning Appreciations

#### I. IN POETRY <sup>5</sup>

*A. M. Jordan*

The studying of poetry is greatly helped by reading it aloud. Let us consider a poem of Burns: "To a Mouse." To begin with read the poem rapidly, paying especial attention to the idea expressed. Then think to yourself "Did I ever have any experience with a mouse?" "How did I treat her?" "How did I feel?" "What were my thoughts?" "Were they concerned with anything more than the immediate objects before me?"

You will have noticed that the vocabulary of the poem is quite difficult. Work now must be done in looking up those curious Scotch words. Hunt up the passage which to you is the most beautiful. You must always have your weather eye out for words and epithets of unusual meaning. Then with these things done return to your poem. Read it through aloud—preferably to some one who is the audience. What thoughts arise in you? Great thoughts it is hoped, such as that all nature is akin ("nature's social union"), or that animals should gain our sympathy because they, too, use foresight in the carrying out of their purposes. Then comes the final reading of the poem from beginning to end. The obscure phrases and words have been cleared away; the historical allusions have been looked up; the poem has been studied in detail, section by section. When these things have been done the full sweep of the poem is enjoyed by reading it from beginning to end.

One sees that, after all, the poet thinks mice are like men ("But, mousie, thou are no thy lane") in having their plans go wrong and they may even be better off than men because the latter worry about the past and fear for the future. Those last two stanzas are true to life. They are beautifully expressed: They are literature. Such great gems of thought should be memorized

<sup>5</sup> From A. M. Jordan, *How to Study*. Boston: The Christopher Publishing House, 1936, pp. 58-59.

because they furnish you samples of great thoughts beautifully expressed against which to measure others.

In nearly every case, some knowledge of the life of the author and of the conditions under which the poem was written is of value in appreciating the poem. Burns grew up in a rural community. His home was a clay cabin which was built by his father's own hands. He knew about mice first hand because of his experiences in the fields. Then, too, this Scottish poet had been troubled on many occasions by the differences in social position between his family and that of the more favored ones of his community. The life of Burns, too, was characterized by many ups and downs; his plans had often gone awry. He thus is speaking from the heart in those last two stanzas and as a result they ring true.

## 2. IN THE FINE ARTS <sup>6</sup>

*Walter Sargent*

Twilight was selected as a topic for special observation. The children were encouraged to gather pictures of twilight from magazine illustrations, photographs, and other sources. They were led to observe twilight effects out of doors. The results of these observations were rendered definite by means of notes made with water color. The colors of the sky, clouds, trees, and buildings on different evenings were recorded. The children noted whether the buildings seen against the sunset sky appeared in their local color, or were flooded with the golden glow, or contrasted with it by appearing to be complementary in hue. Many children were enthusiastic in their descriptions of twilight effects and made sketches, some of which were crude in color while others were soft and delicate.

The next steps in the experiment were made possible by the cordial co-operation of the Museum of Fine Arts, which reproduced in half tone several of its pictures representing twilight, and made these reproductions available for the schools at cost. About sixteen hundred of these were bought by the teachers and distributed to the pupils. Each child made two or three simple copies in pencil of the Museum picture given him, reproducing the effect as well as possible by this means. He then experimented by painting over these pencil sketches with water color the different schemes of twilight color which he had recorded. He thus gained intimate acquaintance with an excellent black-and-white composition, and added to this the color, an element which was the result of his own observation.

After this many of the children wished to visit the Museum in order that they might see the original picture. Those who had opportunity to do so, when they saw for the first time the painting with the composition of which they were already familiar, viewed it with particular attention to see what colors had been used by the artist and how his scheme compared with their own. Usually an art museum appears to a child somewhat like a panorama.

<sup>6</sup> From Walter Sargent, "An Experiment in Picture Study," *School Arts Book*, Worcester, Mass.: The Davis Press, 1909.

The previous study of a particular topic, however, served to isolate a few pictures from the mass and make objects of special attraction. The children felt a fellowship of interest and effort between themselves and the artist.

#### IV. Development of Methods, Ideals, and Attitudes

##### I. IN LATIN <sup>7</sup>

1. The methods of teaching should be such as will develop in the pupil correct habits of study. The methods adopted by the teacher can be effective in developing the pupil's power to understand and read Latin or in developing valuable general habits just in so far as they create corresponding methods of study on the part of the pupil. Upon the development of sound habits of study, permanent and general in their effect, the utmost emphasis should be placed. Not simply what the pupil does under the immediate direction or personal supervision of the teacher, but what he does by himself in his own study of assigned lessons is the final test which any sound method of teaching must successfully meet.

2. The methods of teaching should be such as will contribute directly or indirectly to the progressive development of power to read and understand Latin as Latin and at the same time cultivate in the pupil desirable general mental habits, increase his fund of information, stimulate his appreciation of good literature, inculcate right social attitudes, and train and encourage him to apply independently facts and processes acquired in the study of Latin in other fields of intellectual activity. The development of these immediate and ultimate objectives should be continuous, concurrent, and interdependent.

3. The methods of teaching should be such as to utilize constantly and to the fullest extent the previous experience of the pupil. In the teaching of Latin, especially in the elementary stages, this involves a knowledge on the part of the teacher of the previous linguistic experience of his pupils in English and a careful selection of those elements which will furnish the best basis for learning the vocabulary, syntax, forms, word order, and general sentence structure of the new language to be learned.

4. The methods of teaching should be such as to enlist the interest of the pupil to the fullest extent consistent with the educational ends in view. Other things being equal the pupil will acquire more readily, retain longer, and apply more widely those facts and processes in which his interest is most keenly aroused. Pupils may be depended on to show a relatively greater interest in classroom questions which are functional rather than formal in character. The Grise study shows a distinct preference on the part of pupils for the following types of question in the class recitation on an assigned passage:

Tell the story up to the point where the new lesson begins.

Tell what connection this passage has with what has gone before.

<sup>7</sup> From *The Classical Investigation*, Part I, General Report, Princeton University Press, 1924, pp. 181-183.

Tell briefly the story contained in the advance lesson.

Questions on inflections, such as "How does the English word 'mission' help you to tell the fourth principal part of *mitto*?"

Questions on English derivatives, such as "What is the meaning of 'approximate' (derived from *proxima*)?"

In the case of every type of question listed above a larger number of the pupils stated that they liked or thought they would like to do the sort of thing involved in the question than reported that they had commonly been asked to do it.

## 2. IN THE SOCIAL SCIENCES<sup>8</sup>

*M. J. Stormzand and R. H. Lewis*

There is an intermediate realm between these learning experiences and the adult's actual civic enterprises. This intermediate field may be thought of as that of amateur citizenship, indirectly connected with the civic pursuits of the mature and involving the possibilities of considerable helpful contribution to the communal welfare as well as a worthy opportunity for practice in real civic service. This is a field that has too commonly been overlooked by the schools, especially for those high school students who possess abilities and attitudes that qualify them for such co-operative service. Without imposing partisan views or bias, the social studies teacher may even be expected to promote or encourage political activities that will give training in civic experiences. Let the student determine his own political affiliations or be determined by the influence of home preferences, he may still be encouraged to try his hand at such political activities in an election campaign as canvassing; distributing literature in behalf of preferred parties or candidates; making posters to be displayed in local store windows; or preparing and, if ability warrants and opportunity offers, delivering speeches for political meetings. In local contests there is no reason why an impartial program, in the nature of a debate or a series of separate speeches by students, presenting all sides of an issue or an election contest, may not be planned by the amateur citizens for the enlightenment or judgment of their elders. Such humble duties as attendance at political meetings and a critical discussion of the campaign orators can be required of all prospective citizens.

This explicit discussion of a few such civic activities, selected at random from the list above, should be sufficient to show the possibilities of promoting projects, approximating or realizing adult civic or political duties, in the intermediate field of amateur activities. One need only take a second glance at the list to realize that the possibilities of directing student energy into experiences that will offer valuable training and strongly promote proper social attitudes are even more feasible in many lines of nonpolitical community service. For many of these services it is difficult enough to get adequate adult co-operation because of occupational demands. The direction of amateur

<sup>8</sup> From M. J. Stormzand and Robert H. Lewis, *New Methods in the Social Studies*. New York: Farrar & Rinehart, Inc., 1935, pp. 94-96.



citizenship into organized co-operation in community enterprises that involve no partisan conflict can win only the most generous appreciation for one's school. Initiative in such social service could nowhere more reasonably be expected than in the social studies classes.

### 3. IN THE NATURAL SCIENCES <sup>9</sup>

G. R. Twiss

Ideals constitute the motive power for human endeavor. This is true for the adolescent no less than for the adult. Adolescence is the very time when the tendency toward idealizing is strongest. What the youths or maidens choose to do, how they regulate their conduct, depends, as far as their personal initiative is concerned, on what they think worth while. Hence the importance of recognizing the values of scientific ideals, and making every effort to realize them in the teaching process, can hardly be overstated. These ideals may be gained incidentally and unconsciously through practice in squaring conduct with them, through formation of the habits that they represent, and through learning by repeated experiences that the highest kind of satisfaction results in the long run from holding tenaciously to them.

Scientific study, if carried on in the true scientific spirit, compels sincerity, out-and-out intellectual integrity, uncompromising honesty, at every step. "What are the actual facts?" "What is the truth about them?" These are the sole ultimate questions of scientific study. To know the truth and put it into usable form is the only aim. Since honesty is of the very essence of scientific study, the student of science under good scientific instruction is trained day by day to habits of honesty, to the habit of seeking the truth, and he may therefore come to realize the general value in individual and social life of sincerity, honesty, and love for knowledge of reality for its own sake. He may subconsciously analyze out and generalize these ideals from the daily practice of these virtues in classroom and laboratory. Now although it is fair to count on much in the way of their subconscious acquisition, yet great opportunities for immediate motivation and the determination of future character will be lost unless the teacher constantly holds up the worthy ideals before the pupils, and occasionally points out their utility, both for accomplishing the scientific work immediately in hand and for regulating the conduct of a successful life. In doing this *the situations chosen as examples of such utility should always be specific and concrete, not general or abstract.*

Referring again to the law of mental connections, the teacher should understand that the only way to make sure that the ideal of honesty in the schoolroom shall be recalled and used in the various situations outside is to have the pupils associate it with a great variety of these situations with "frequency, vividness, and resultant satisfaction," and then to generalize it.

Prudish sermonizing is harmful. It defeats its own end, but *if the teacher*

<sup>9</sup> From G. R. Twiss, *A Textbook in the Principles of Science Teaching*, 1925, pp. 93-95. By permission of The Macmillan Company.

*loves the ideal and lives it himself, he will find multitudes of tactful ways, in addition to the powerful way of example, for quietly influencing his pupils to adopt it deliberately as a rule of life.*

Other important ideals that may be expected to accrue from the study of science by the scientific method are (1) achievement; (2) industry; (3) "stick-to-itiveness," concentration of attention on the thing in hand; (4) efficiency, or accuracy combined with speed; (5) resourcefulness; (6) open-mindedness; (7) a logical, well-balanced mind; (8) hatred of narrowness and prejudice; (9) social service; and (10) the ability to present ideas clearly and convincingly.

## V. Solution of Problems

### I. IN MATHEMATICS (ALGEBRA) <sup>10</sup>

*A. M. Jordan*

But most difficult of all for algebra students probably is the statement of the problems. Most good algebras today give a great many illustrations of how problems are stated. They practice you up on words like "sum" and "difference" "increased" and "diminished." Above all *master these simple illustrations*. Until you do there is not much hope of success in solving the more difficult problems. Here, indeed, there is required *accurate reading* of the problem and a remembering of the fact that the equation is a balancing process.

"What number increased by twice itself and then diminished by 24 equals 144?"\* is one problem. How is this to be stated? In general we let  $x$  equal the smallest number which will give us the solution. Here, let  $x$  = number. Let's observe the phrase "number increased by twice itself." If  $x$  is the number then to increase it by twice itself is simply:—

$$\begin{aligned} &(\text{number}) + (\text{increased by twice itself}) \\ &x + 2x - 24 \text{ (and then diminished by 24)} = 144 \text{ (equals 144)} \end{aligned}$$

---


$$3x - 24 = 144$$

$$3x - 24 = 144$$

$$- 24 = - 24 \text{ (subtract } - 24 \text{ from both sides)}$$

$$3x = 168$$

$$x = 56$$

Now substituting in the equation  $3x - 24 = 144$  we get  $168 - 24 = 144$ , which is correct.

(1) *Read the problem carefully and change the words into symbols*

a. Another problem is a little different.

<sup>10</sup> From A. M. Jordan, *How to Study*. Boston: The Christopher Publishing House, 1936, pp. 80-83.

\* Reprinted from *A First Book in Algebra* by Fletcher Darell, and E. E. Arnold, by the permission of the Charles E. Merrill Company, Publishers.

"If five times a certain number is increased by 20.4, the result is equal to three times the number increased by 160. Find the number."

Let  $x$  = the number  
 $5x$  (five times a certain number)  
 $+ 20.4$  (is increased by 20.4)  
 $=$  (the result is equal)  
 $3x$  (three times the number)  
 $+ 160$  (increased by 160)

Now to put it all together

$x$  = number  
 $5x + 20.4 = 3x + 160$   
 $3x$   $3x$  (subtract  $3x$  from both sides)

---

$2x + 20.4 = 160$   
 $- 20.4 - 20.4$  (subtract 20.4 from both sides)  
 $2x = 139.6$   
 $x = 69.8$

Substituting in the equation we get

$5(69.8) + 20.4 = 3(69.8) + 160$   
 $349 + 20.4 = 209.4 + 160$   
 $369.4 = 369.4$

b. "The distance of the sun from the earth is 92,800,000 miles. This distance exceeds 107 times the diameter of the sun by 95,200 miles. Find the diameter of the sun."

Here the difficulty lies in the interpretation of the word "exceeds." Suppose you wish to express this statement in an equation—"75 exceeds 50 by 25." One could say  $75 - 25 = 50$ , which is true. When one number "exceeds" another number "by" a certain amount one must subtract this number which follows "by" from the first number to make it equal to the second. Now to return to our problem

Let  $x$  = the diameter of the sun  
 $107x$  = (107 times the diameter of the sun)  
 $92,800,000 - 95,200$  (this distance exceeds 107 times the diameter of the sun by 95,200)  
 Then  $107x = 92,800,000 - 95,200$   
 $107x = 92,704,800$   
 $x = 866,400$

In all these cases the solution of the problem depends upon the precise interpretation of the words and their relations in the sentence.

2. IN SOCIAL SCIENCE<sup>11</sup>*A. C. Bining and P. H. Bining*

*The pupil must feel the problem his own.*—Much has been written concerning the technique of problem solving. Some of this technique has already been touched upon in the foregoing discussion. There are, however, four general principles that the teacher must bear in mind. The first of these has already been briefly mentioned. The pupil must feel that the problem is his own. He must feel its challenge to his thinking. It has already been intimated that this does not mean that the teacher must follow entirely the leads of the pupils. Such a procedure would result in educational anarchy in the classroom. Many of the problems that arise spontaneously in the minds of the members of the class might not be worth solving. Much poor instruction has resulted from following the listless wanderings of the class. . . .

*The problem must be stated definitely.*—After the class has come to feel the problem as its own, the teacher must next see that it is stated in definite terms and constantly held before the pupils. This may seem superfluous, but it is important because pupils forget so easily. Even though the class has felt and sensed the problem, a half-hour's discussion or the searching of a reference may make them lose sight of the real problem or even forget it. This is true of adult life. How often do we see in public meetings, where a particular question is discussed, the speakers constantly digressing. With the problem clearly defined, the teacher is able to keep the class to the problem. This is good for its own sake because it aids the pupils to think clearly and to concentrate deeply. With the problem well defined and continually before them the pupils are able to keep it in mind when working on the references.

*Selecting the materials for solving the problem.*—The third step concerns itself with the material necessary to solve the problem. This may begin with a class discussion. If the pupils have had the opportunity to understand the background of the problem they will all have some views on it. The teacher must decide how much he will contribute to this background. It is certain that the teacher should not have his class laboriously searching out minor details that he can easily give. How much the teacher will assist the class in finding outside material is also a question that the teacher must decide. . . .

*Solutions must be definite and clear.*—The final step concerns the conclusions reached. The solution to the problem must not remain dangling in the minds of the pupils. The conclusions reached must be definite. There are, of course, certain problems, such as many of our contemporary ones, that cannot be definitely solved. Yet even in these some concrete conclusions must be reached even though the problems are not solved. Many means may be employed in securing this definiteness. One of the pupils may summarize the conclusion before the class, and then have the class evaluate and criticize it

<sup>11</sup> From A. C. Bining and P. H. Bining, *Teaching the Social Studies in Secondary Schools*, New York: McGraw-Hill Book Company, Inc., 1935, pp. 112-115.

until it is in acceptable form. The pupils may also write out the conclusion. In so doing many hazy ideas often become clear.

### 3. IN NATURAL SCIENCE<sup>12</sup>

G. R. Twiss

*Organization in the study of light.*—Similarly in the study of light we may create a problematic situation of absorbing and stimulating interest by forming through a small opening in a closed shutter of the darkened classroom an inverted image in its natural colors of the scene outside. It may be displayed on the opposite wall or on a white screen. Out of this situation such questions as the following arise for solution: What is the cause of this image? What conditions determine its size and intensity? What information does this experiment and its underlying principles offer as to the question of how we judge the sizes, distances, and relative directions of objects? Can a photograph be made with a camera minus its lens (pinhole camera experiment)? Is it true that the smaller the hole, the clearer the image, but the less its intensity and the greater the time of exposure to make a photograph? Why? What are the geometrical relations that determine the size of the image as compared with that of the object? All the information that grows out of the study of these questions may be associated with the principle of the rectilinear path of light (in a homogeneous medium), and organized about it. The applications of the simple geometry of straight lines, vertical angles, and similar triangles to the solution of these problems are of great educational value, since they give motivated practice in the use of mathematics, and demonstrate its value as a convenient tool in reaching valid conclusions that can be further tested by experiments. Why are expensive lenses needed in making photographs, when we can make photographs without them? This question will have come up by the time the pupils have gone thus far; and the first step in working it out is to repeat the initial experiment, placing a long-focus lens in the shutter-aperture, and note the change in the size, distance, distinctness, and illumination of the image. These observations clear up the facts, but do not answer the question, and so a careful experimental study of the properties of lenses becomes necessary. This study reveals the fact that the photographic lens is useful because it causes a diverging or parallel beam of light to converge at a focal point, and so forms an image made up of small intense points of light instead of by large overlapping patches.

<sup>12</sup> From George R. Twiss, *A Textbook in the Principles of Science Teaching*, 1925, pp. 306-308. By permission of The Macmillan Company.

## VI. Learnings Involving Organization and Integration of Experience

### 1. IN ENGLISH<sup>13</sup>

Lucia B. Murrielees

One useful device for clarifying thought, but one that pupils avoid, is that of numbering the phases of a topic. This device is particularly useful to them in their examinations. Frankly I admit to them my own useful method in examinations of appearing to know more than I do by writing "There were — causes for the widespread discontent," numbering the causes as I think of them *one, two, three*, etc., and then at the conclusion returning to my original statement and filling the blank. If you can lure your classes into writing such an introductory sentence, what have you done? Forced them to organize their material into a certain number of parallel statements. Later, of course, you may agree with Mr. Barrett Wendell that this use of *first, second, third* is monotonous and "palpably artificial." But if you can get it, if you can lead a class into such clear thinking that it sees topics as wholes, subdivides them, and does not forget that a *third* demands a *first* and a *second*, you have done well. You have laid a ground plan for the organization of their thoughts that is clear and sensible. By board work, by twenty minutes of quick writing in class, by suggesting a question one day and returning to it later, by analysis of some author's well-organized exposition, you can give your class stimulating work in methods of organization. You can give excellent training and arouse genuine interest by matching your wits with theirs in an analysis of some such questions as these:

1. There are at least—reasons why we need a new gymnasium.
2. There were at least—causes for Jessica's unhappiness in Shylock's house.
3. There at least—causes for our admiration for Colonel Lindbergh.
4. There at least—reasons why we should have student government.
5. There were at least—traits in Silas Marner that lay dormant during his long solitude.
6. There were at least—desires that motivated Becky Sharp's relationships with others.
7. There are at least—contrasting characteristics found in Brutus and Cassius.

Of course there is a danger here. You do not want to breed superficial thinkers, future citizens who make snap judgments which they take for sound thought. I think, however, if you give the class sufficient time for thought, you need not worry upon this score. If I could get a class invariably to analyze a topic, a question, a situation, and think of it as dividing itself into a few essential phases, I should know that the millennium had come. What do most pupils do? Look at a question, rush headlong upon it, and write whatever comes first into their minds. This precipitancy arises in part from the pupils' knowledge of the school system. For years they have suffered

<sup>13</sup> From *Teaching Composition in High School* by Lucia B. Murrielees. Copyright, 1931, by Harcourt, Brace and Company, Inc., pp. 184-185.

from long examinations: hence they know the danger to their grade if they stop to think out their answers. Their reckless speed is an interesting comment upon our educational methods.

## 2. IN SOCIAL SCIENCE <sup>14</sup>

*H. C. Morrison*

When the teacher is convinced that assimilation has taken place in the class as a whole, organization is announced. For this purpose the class assembles without books, notes, charts, or any other helps. Their problem is now to gather up the argument of the unit in outline form, with the essential supporting facts. Once more, the organization is focused upon the central understanding and not upon the assimilative material. Hence in form it is the outline of a coherent and logical argument and not merely an exhibit of facts.

The outline may take the form of a syllabus with the main headings which carry the argument, the subordinate headings, and the appropriate sub-headings; or it may be an outline in the systematic form of brief topic sentences. In either case, the class must be taught how to make the outline, especially in a school in which such teaching is new. Once the pupils have caught the idea, however, they will organize very passably well and improve as times goes on.

The notion of organization can be developed in the early grades, certainly the fourth. The essential difference between the organizations of the young children and those of high school pupils seems to be found in the principle that the young children's organization contains only the main heads of the argument while that of older pupils develops the subheads. Pupils in the senior high school will often produce very lengthy syllabi running to several pages of paper. Indeed, there comes a time when the older pupil needs to be trained out of a tendency to prolixity. . . .

On each organization, the process of training is much like that used in intensive reading. Several of the papers are taken up and discussed. This point has nothing to do with the matter; this one has. This paper is a good organization, because as you read the points there comes into mind the meat of the argument. Every point that John has made has a definite bearing, while this and this point on James's paper have nothing to do with the story. There will be some children who do nothing at all, and it is by no means easy to distinguish between those who have failed to catch the notion and those who have simply made no effort. In general, the latter will be in the majority. These people are simply told that they will keep on trying, after school if need be, until they produce something which is acceptable, and at least an evidence of effort. After this period of reteaching, the papers are turned back for perhaps a single second attempt. . . .

<sup>14</sup>From H. C. Morrison, *The Practice of Teaching in the Secondary School*. Chicago: The University of Chicago Press, 1926, pp. 302-305.

The organization is not primarily a unit test, but a part of the learning process. The element of performance is too large for reliability as clear evidence of understanding. None the less, it, like every other part of the pupil's performance in learning, is full of revelations touching the organization of the course, the technique employed, and the pupil himself. We cannot use failure in organization as evidence of nonmastery in opposition to the evidence of the assimilation tests, but we can draw conclusions touching the guidance of individual pupils and the conduct of subsequent units.

### 3. IN NATURAL SCIENCE<sup>15</sup>

*Elliot R. Downing*

*Mastery.*—One of the advantages claimed for this unit type of course organization is that it enables pupils to have a constant sense of mastery. When a student takes for a year in high school a subject like biology or chemistry or physics, he feels lost in a big field. He wanders about in it for weeks and months not knowing just where he is going nor exactly what he is responsible for getting out of his journeyings. So he comes to his final examination with fear and trembling, hoping that he has chanced to pick up the information needed to pass it but always apprehensive that some important areas have been missed in his wanderings.

When, however, the subject matter of the course is organized in units small enough to be clearly apprehended, each with a perfectly definite outcome of which the student is finally aware, then he works to a purpose and is quite conscious when he has achieved its mastery. If the end product of a unit is the mastery of some principle which the student can actually use in the solution of problems of the sort that arise in his life, or if it is the acquisition of skill in the use of some of the elements or safeguards of scientific thinking so that he can think through his problems with certainty, then he can be provided with tests to ascertain whether or not he has really acquired the thing he set out to accomplish. He either can solve such problems or else cannot. Of course, he could be faced with problematic situations involving the principle that would be beyond his range of experience and so complex that he could not solve them. But if the problems used to exercise his skill and test his mastery are of the sort common to his age level, then apparently the line between mastery and nonmastery is pretty sharply defined.

To test the acquisition of desirable emotionalized standards by any formal exercises seems more difficult. The achievement of such outcomes must perhaps, at present, be judged by indirect means. Whether a pupil has so caught the spirit of the great scientists that he is ambitious to serve his fellows rather than exploit them for his own selfish ends can probably be judged better by observing his actions in social relations than by any written test. Whether he is on the way to acquiring an admiration for the bold courage of the

<sup>15</sup> From Elliot R. Downing, *An Introduction to the Teaching of Science*. Chicago: The University of Chicago Press, 1934, pp. 104-106.



explorer so that he will look upon his own life as a thing to be cheerfully hazarded and dashinglly used may be judged better by the type of books he is reading from the library than by any written exercise at present available.

## VII. Transfer of Training

### I. IN LATIN<sup>16</sup>

The factors involved in experiments and measurements dealing with disciplinary objectives are so numerous and so complicated that in the present state of development of experimental technique it was found impossible to secure the co-operation necessary to carry out conclusive scientific studies in this field within the time limits set for the investigation. Accordingly the evaluation of the disciplinary objectives has been limited mainly to an analysis of opinions secured from recognized authorities in the fields of education and psychology and from experienced teachers of Latin. Use has also been made of the results of other investigations in this field.

1. *The development of certain desirable habits and ideals which are subject to spread, such as habits of sustained attention, orderly procedure, overcoming obstacles, perseverance; ideals of achievement, accuracy and thoroughness; and the cultivation of certain general attitudes such as dissatisfaction with failure or with partial success.*

It is obvious that the development of these mental traits is not the province of Latin alone, but should be sought in every subject in the curriculum. This fact, however, does not absolve teachers of Latin from the responsibility of so organizing the content and method of the Latin course that the study of Latin shall make its greatest possible contribution to the attainment of this common objective.

If these mental traits can be developed through the study of Latin and if their spread to other situations and experiences can be effected, then the importance of this objective for all pupils who are studying Latin is evident. Practically all the psychologists who contributed to the symposium on disciplinary objectives in the study of Latin expressed the opinion that these traits, if developed in the study of Latin, are subject to spread. This indicates a very marked change in the opinion of psychologists during the last twenty years. The majority of these psychologists expressed the opinion that the transfer of these mental traits to other fields is automatic only to a slight extent, if at all.

Practically all these psychologists, including those who believe that there is some automatic transfer, are agreed that the extent and amount of this transfer can be increased in proportion to the extent to which favorable conditions as to method are provided. Of these over 70 per cent expressed the view that conscious generalization is essential or desirable. This means that to

<sup>16</sup> From *The Classical Investigation*, Part 1, General Report, Princeton University Press, 1924, pp. 55-57.

guarantee a considerable transfer the common element to be transferred must be brought specifically to the pupil's attention and generalized into a principle, and the application of the principle to other fields made clear. The standard set for the preparation of the regular Latin work should then be set up as an end worth striving for, not only in Latin but in all subjects. "The real problem of transfer is a problem of so organizing the method of training that it will carry over in the minds of the students to other fields."

## 2. IN MODERN FOREIGN LANGUAGE<sup>17</sup>

*Peter Hagboldt*

Transfer from the native to the foreign tongue is quite common. The identical element is the emotion or thought to be expressed. The native expression of that thought is firmly established in all its elements, and some elements are carried over, particularly sounds, idioms, and constructions. Frenchmen pronounce *roast beef* and *brown gravy* with a uvular *r* a closed *o* lacking the offglide to *u* in *brown*, a closed *i* in *beef*, and an *e* without the offglide to *i* in *gravy*. Young Germans beginning their study of English use constructions like *I got at six o'clock on the morning up*. German immigrants say *I am since fifty years here* instead of *I have been here fifty years*; they base their construction on *Ich bin seit fünfzig Jahren hier*.

Transfer also occurs from the foreign to the native language. When people have lived in a foreign country for a considerable time the foreign language predominates in matters concerning trade, business, or profession. So strong is this predominance that native words of frequent occurrence are no longer recalled and are replaced by corrupted forms of foreign words. This type of transfer is so common that entirely new dialects may arise through it. Pennsylvania Dutch is a living example. Widely quoted is the sentence *Die cow is uber die fence gefumped und hat die cabbage gedamaged*. In the Southwest we find Spanish intermingled with English in words like *lonche* for lunch, *cuora* for quarter, *ponchap* for pawnshop, *aiscrin* for ice cream.

An indirect sort of transfer is sometimes brought about through teaching devices. If a thought masterfully expressed in the foreign tongue induces teacher and student to search for the fittest expression in the vernacular, new knowledge and new abilities may be the result. The same sort of transfer is favored by the study of etymological relationship of words and by a comparative study of grammatical and syntactical phenomena. It was this instructive comparative study, no doubt, which Goethe had in mind when he said that he who does not know foreign languages knows nothing of his own.

<sup>17</sup> From Peter Hagboldt, *Language Learning*. Chicago: The University of Chicago Press, 1935, pp. 48-50.

3. IN MATHEMATICS<sup>18</sup>

J. O. Hassler and R. R. Smith

It is not our contention that the study of geometry per se will give a man great ability to reason in all things. If this were so, the names of those of us who teach geometry should be added to the list of the seven sages. We have said, however, . . . that demonstrative geometry may be made the basis of the study of methods of reasoning, and that from this as a simple beginning a better superstructure can be built because the foundation is good. We choose geometry for this purpose because, although it is the most exact science known to man, its essential aspects can be understood by the secondary school pupil and because its simple situations offer a training which a pupil could not expect to get in any other subject before amassing an impossible number of facts. For this reason, he can be taught in this field with comparative ease to keep his problem in mind, look at different parts of it for stimuli to recall other facts, consciously make hypotheses, and test each one systematically until finally the result is reached.

The first step in aiding transfer is to do what every good teacher of geometry always does—make the subject itself thoroughly understood. The second step is to discuss procedures, in geometry, with the aim of lifting the method from the particular subject matter. If skill in reasoning is to be transferred to other fields than geometry, it must first be brought clearly to consciousness in the field of geometry. The foundations must be discussed at every opportunity. Deductions, definitions, postulates, methods of proof, systematic means of analysis—all these must be more than mere words to the pupil. He should see how dependent the process of good reasoning is upon organization. He must realize that the reason that all come to the same conclusions in geometry is that they all agree to the same postulates and use the same axioms as methods of procedure. All this gives the pupil a background of experience for any developments to come. For instance, when a coach in debating says, "Your difference is just a matter of definition," or "What you should discuss is not this particular point but the assumptions which lead directly to this point," he can understand what is being said.

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<sup>18</sup> From J. O. Hassler and R. R. Smith, *The Teaching of Secondary Mathematics*, 1930, pp. 370-371. By permission of The Macmillan Company.

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## EXERCISES

1. Describe some of the habits which an individual must acquire in learning a foreign language.
2. Compare the learning of rules of algebra with that of sentence structure. Evaluate Thorndike's thesis that "A man's conduct seems to determine his conscience more than his conscience his conduct."
3. Explain in some detail the role of feeling tones in the development of appreciation. Apply the principles of the conditioned response to the learning to like a poem.
4. Distinguish sharply between the learnings involved in appreciation and those involved in the acquisition of skill. Can you subsume both types of learning under the same laws?
5. Describe exactly how an attitude is learned. Just how would you proceed to enlist the interest of a class in Latin. Just why is interest in school subjects so very important?
6. Compare the procedures followed in developing interest in Latin with those used in acquiring good social attitudes.
7. What ideals and attitudes are claimed for the proper learning of a natural science?
8. Describe precisely the steps in the solution of a problem. Illustrate by reference (1) to an algebra problem; (2) to a problem in social science.
9. Much attention is given in psychology to the development of a mental set. How is the set defined in the solution of a problem?
10. Explain psychologically the meaning of the phrase "organization of experience." Illustrate from (1) the field of physics; (2) the field of English.
11. Do you think that the process of organization is very important in social science? Why?
12. What is the psychological advantage of having work organized into units small enough for the pupil to be clearly aware of his progress.
13. Explain exactly what transfers from the study of Latin, a modern foreign language, and mathematics. Conclude as to the conditions under which training transfers.

## CHAPTER XVI

### TRANSFER OF TRAINING<sup>1</sup>

L. W. Webb, Northwestern University

#### I. Introduction

The more progressive schools are constantly striving to develop the capacity for growth. Another way of expressing the same idea is that teachers stimulate and direct the learning experiences of children so that knowledge becomes power. When learnings are acquired in isolation from other learnings and when the learner fails to develop the power of generalizing his experiences and making applications of his learnings to new situations, there has been little power or discipline gained. A liberal education connotes power. Hundreds of psychological studies have been made in this field. One of the outstanding revelations has been that transfer, the saving effected in a later learning because of an earlier learning, depends upon the method used by the learner rather than upon the particular subject studied, other things equal. Latin can be taught in a way that causes it to interfere with subsequent learnings, or it can be so taught that it illuminates English, French, history, art, and many other subjects.

In this chapter the readings will help the student to discover under what conditions and circumstances growth takes place through functional learning. The principle of transfer has been used or implied throughout the discussions in the preceding chapters. When knowledges are being acquired with economy, the learner is also developing an attitude toward the task, and discovering certain general principles that work. When the student thinks reflectively, he is acquiring power through solving present problems by drawing upon previous learnings and generalizations. In fact, the power to generalize and apply one's learnings in new situations is the heart of transfer. When the learning of school subjects fails to develop the power to generalize and to apply experiences, the time spent on them has been largely wasted. The selections in this chapter will help the teacher in setting up for pupils learning situations that will educate them to deal more effectively with new situations that present themselves.

#### II. A Distinction between Formal Discipline and Transfer of Training

It will be wise for the student of this problem to have a clear statement of the theory of formal discipline, also an equally clear statement of the theory of transfer of training. The first few quotations endeavor to clarify these issues.

<sup>1</sup> Every text in educational psychology treats this subject at some length. This chapter corresponds to the similar discussions in the following: Griffith, *An Introduction to Educational Psychology*, Chapter XIII; Skinner and Collaborators, *Educational Psychology*, Chapter XIII; Trow, *Educational Psychology*, Chapter VIII; Jordan, *Educational Psychology*, Chapters VII and VIII; Sandiford, *Educational Psychology*, Chapter XIV; Mursell, *Psychology of Secondary School Teaching*, Chapter IV; Cameron, *Educational Psychology*, Chapter XIII; Bolton, *Everyday Psychology for Teachers*, Chapter XVIII; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter IX; Benson, *et al.*, *Psychology for Teachers*, Chapter IX; Eurich and Carroll, *Educational Psychology*, Chapter XVII; Gates, *Psychology for Students of Education*, Chapter XIII; and Pressey, *Psychology and the New Education*, Chapters XIV and XV.

## I. FORMAL DISCIPLINE

## i. Statements of Meaning

*James L. Mursell*<sup>2</sup>

What then is the theory of formal discipline? It is the theory that the business of education is the training of the mind. Certain studies are supposed to have peculiar virtues for this end. For instance, it is said that geometry will train the reason, that history will train the memory, that science will train the power to observe or the power of accuracy, that literature will train the imagination, and so on. Above all has the study of the classics been defended on the grounds of its supposed disciplinary value. Most of us have been told things of this sort by our teachers. There is no doubt that it is widely held as gospel. . . .

And just as muscles strengthened by any kind of exercise can then be used for all purposes, so, according to the theory, mental powers developed in one kind of study can be used anywhere we like. If geometry has strengthened the reason, we can reason better about scientific matters, about the executive problems of business, about repairing the engine of a car, or about a social difficulty. If the learning of names and dates in history has improved the memory, then we can better remember the names of acquaintances, or the times of appointments, or anything else. If literature has developed the imagination, then we can use this increased ability whenever and wherever it may be needed. This is the essence of the doctrine. Such illustrations may seem to you fantastic; but many far more so are at hand. Many music supervisors in the public schools insist that learning to read the score is valuable not at all because it is a very useful or important thing to be able to do, but because it develops quickness of reaction, since children must spot notes rapidly. Many teachers of science believe that one chief value of laboratory work is merely to train children in accuracy of movement and physical co-ordination.

Putting it in a nutshell, the theory of formal discipline is a theory that mental growth takes place through formal exercise. According to it, the whole business of education is to provide the right kind of exercise, and thus develop "the powers and faculties of man." It is in the sharpest contrast with our own account, which is that mental growth takes place through significant experience.

*Knight Dunlap*<sup>3</sup>

The most familiar theory was that of "Formal Discipline," which is still in vogue in some quarters. According to this theory, a sort of "general learning" is not only possible, but even necessary. In learning certain things, one is virtually learning a great number of other things. Not every task has the same

<sup>2</sup> From James L. Mursell, *Principles of Education*. New York: W. W. Norton & Company, Inc., 1924, pp. 74-76.

<sup>3</sup> From Knight Dunlap, *Habits—Their Making and Unmaking*. New York: Liveright Publishing Corp., 1932, pp. 112-113.

general potentiality, of course. It is necessary to select those which have the major general learning effects, or "disciplinary value," as it was called. The Greek and Latin languages, classic literature and mathematics were once supposed to be the "disciplinary" subjects *par excellence*. The student studied these subjects, it was assumed, not so much for the linguistic, literary or mathematical knowledge itself as for the "mental training" they conferred.

This exaggerated point of view was possible only in an age when the nature of the learning process was little understood. It is possible only for those who narrowly conceive of the mind as a collection of "faculties" or "intelligences" which are like instruments (hammers, saws, sewing machines, etc.), which when built up, adjusted and oiled are capable of being applied to a considerable variety of jobs. Perhaps a better analogy would be with a muscle which, when properly "trained" by some suitable gymnastic system, is capable of work of a number of types.

"Training the mind," "developing the faculties," "increasing mental capacity" are expressions which were taken in a quite literal sense even a generation ago. We still use the expressions, but only in a metaphorical sense. Our conception of the mind has radically changed, and with this change the doctrine of formal discipline has disappeared, except in quarters where the dust of the past lies thickly. Perhaps, as frequently happens, we have now gone too far in another direction. There was no scientific basis for the dictum of "formal discipline." We suspect that the bases of some of the views which are antithetical to it are as slight.

## ii. Practical Consequences of the Theory <sup>4</sup>

*James L. Mursell*

The theory of formal discipline has had a very significant influence on educational practices. These effects on practice are well stated by Mursell.

A. It has been used to determine what subjects should be studied in school; that is, it has served as a basic theory of the content of the curriculum. Indeed, it was to defend the privileged position of certain subjects that the theory was first made prominent. Until well along after the Renaissance, there was not much question but that the classical languages and literatures should be the staple of education. But decade by decade, the claims of the modern languages and literatures, and above all of the sciences, became harder to resist. The common-sense arguments for teaching these subjects were very strong. How could they be answered? What could one say when it was pointed out that Latin and Greek are much less useful in most people's lives than French and German, chemistry, biology, and physics? The reply developed was that Latin and Greek have pre-eminent value, in that they give far greater opportunities for the training of the mind. In other words, it was said that we must not look first and foremost to the content of what is being studied, nor ask chiefly

<sup>4</sup> From James L. Mursell, *op. cit.*, pp. 76-79.

about its significance, in determining its educational value. We must inquire mainly into its value as a mental exercise.

B. Another consequence of the theory is that it makes teachers indifferent to the content of what they are teaching. This, of course, is natural enough, simply because it is the doctrine that exercise rather than content is important. But it is fatal. Suppose I am teaching a course in geometry in the conventional way. The pupils learn their assignments, memorize proofs of theorems, recite day by day, and write some tests which are largely *memoriter*. If I happen to think of it, I know perfectly well that were these pupils suddenly put up against a life situation in which they had to use geometrical skill, the great majority of them would fail, simply because they have no real geometrical skill at all. If one of them were asked to calculate the area of a roof which made an isosceles right-angled triangle at the peak, though he could not get a ladder long enough to reach the top, would his memory knowledge of the theorem of Pythagoras enable him to get the answer? He has the necessary intellectual tools for this particular bit of life adjustment—or at least he ought to have them. But can he really use them? Every experienced teacher knows the answer all too well.

C. The theory of formal discipline, again, gives us an entirely wrong notion of the nature of good classroom procedure. Manifestly it implies that the important thing is not how much a pupil learns, but how hard he works. The aim is not useful or significant learning, but arduous exercise. So it actually becomes a virtue to make a subject difficult. There can be no doubt that part of the older objections to curriculum revision came from the belief that the new studies were easier than Latin and Greek, and so could not possibly have the same educative value. And it is an historical fact that teachers of Latin have opposed reforms in methods of teaching, and the introduction of improved textbooks, on the ground that such things would make the subject less difficult to master.

## 2. TRANSFER OF TRAINING

*James L. Mursell*<sup>5</sup>

In educational literature we constantly come upon intimations that much of the value of studying certain subjects lies not so much in mastering these subjects themselves, as in the help that they can give us in learning some other subjects. This is the claim that mastery in one field may *transfer* to mastery in another. And it represents the general theory of the transfer of training.

While statements of this kind are so very common that almost every high school pupil has heard them, and almost every teacher has made them, yet for the sake of a clear formulation of our problem we may give a few illustrations. Thus it is said that while the ability to read and write Latin is not perhaps very useful in itself, the subject should be retained in the curriculum because its study tends to improve English, or because it makes the mastery

<sup>5</sup> From James L. Mursell, *The Psychology of Secondary School Teaching*. New York: W. W. Norton & Company, Inc., 1932, pp. 86-87.



of certain modern languages easier. Again it may be believed by some that algebra has not much usefulness in everyday life, but still they may hold that it should remain as a common general requirement in secondary education partly because a knowledge of algebra is important in studying science, and partly because it helps the pupil to think and reason better in general. This last idea is representative of some very ambitious claims frequently made on the basis of the theory of transfer. For often it is said that certain subjects are valuable, not only as helps for other subjects, but because of the excellent and important general mental abilities that they foster. Geometry is often held to develop a reasoning power which can apply far beyond the special province of geometry itself. History is thought valuable, not because a mass of factual information is worth having, but because it promotes various admirable social and even moral attitudes. Among the reasons often given for studying a foreign language, we find put forward the idea that quite apart from any value in mastering the language for its own sake, it can help us build up powers of analysis and accuracy, and even that it can train the memory. Most people could readily multiply such instances as these. All of them come down to the contention that in studying some one thing we often learn more than just this one thing itself, and that improvement in some one field can transfer to other fields as well. This is the theory of the transfer of training.

Now some of the claims regarding the theory certainly cannot be substantiated. But others can. And so it is most important to be able to discriminate between what is true and what is false, and to understand the true causes of transfer, and how to make them operative. Moreover, we shall find an added significance in this whole topic in the fact that transfer, when it occurs, depends precisely upon the proper organization of mental abilities, and when it does not occur, this is because organization is not properly directed.

*Boyd H. Bode*<sup>6</sup>

Formal discipline is frequently identified with transfer of training. In the interests of clearness, however, it is worth while to point out in passing that transfer may be explained in more than one way. From the standpoint of formal discipline transfer of training means that training in a subject like Latin will help in some other quite unrelated field, such as physics or banking. The transfer is achieved, not through the application to the new subject matter of anything that is learned in Latin, but through the increase in power that has been gained. It is antecedently possible, however, to account for transfer of training in a different way. The study of a given subject may make for greater efficiency in some other field through the adaptation of content or method and not through increase in the powers of the faculties. There appears to be no sufficient reason why this should not be called transfer of training too. In fact, a number of writers announce that they believe in trans-

<sup>6</sup> From Boyd H. Bode, *Conflicting Psychologies of Learning*. Boston: D. C. Heath and Company, 1929, p. 36.

fer of training, although they reject the theory of formal discipline. According to this standpoint, transfer of training means the application of previous experience to new situations. It does not mean formal discipline, since formal discipline is simply one particular explanation of how transfer takes place. It seems more expedient at the present time to make this distinction. If we do so, the rejection of formal discipline simply opens the way for other theories to account for transfer of training.

### III. The Attempt to Solve the Problem Scientifically

The theory of formal discipline grew out of speculation about the value of various courses in the curriculum. The theory was assumed to be correct by educators until about 1890, when William James made the first scientific attack on the problem. Since that date a large number of experiments have been made in an endeavor to determine the transfer value of learning various materials. The differentiation between transfer of training and formal discipline has grown out of these experiments. Also real insight into the educational significance of the problem has been gained as a result of the experimentation. Excerpts from some of the more important experiments are presented below.

#### I. EXPERIMENTS TO DETERMINE THE FACT OF TRANSFER

##### i. Sensori-motor Materials <sup>7</sup>

*L. W. Webb*

In terms of mazes the problem is readily illustrated. Several groups of subjects first learn a common maze A, and each group subsequently learns a different maze. One group is thus transferred from Maze A to Maze B, another from A to C, one from A to D, another from A to E, and one from A to F. If the nature and degree of the transfer is wholly a function of the first maze, fairly uniform results should be secured for all groups. The group differences should be only such as can be attributed to chance or group factors. Marked variations in the results would indicate, on the other hand, that the nature and degree of transfer is in part a function of the nature of the second maze. In our experiment six groups of subjects first learned Maze A. These groups comprised a total of 54 rats and 21 humans. A group of nine rats and a group of five humans were then transferred to Maze B; a group of eleven rats and a group of six humans subsequently learned Maze C; a group of six rats and one of five humans were transferred to Maze D; a group of eight rats then mastered Maze E, and a group of nine rats subsequently learned Maze F.

The transfer effect is measured by the difference between "original learning" and "transferred learning." By original learning we mean the acquisition of a maze by a group of subjects without previous maze experience. By trans-

<sup>7</sup> From L. W. Webb, "Transfer of Training and Retroaction." *Psychological Monographs*, 24, No. 104, pp. 16, 17, 33, 50, 52, 53.

ferred learning we refer to the mastery of a maze by a group with a previous maze experience. Thus control groups were necessary for Mazes B, C, D, E, F, in order to secure data on the original learning.

The possibility of the degree of transfer depending upon either the first or second learned problem has been previously mentioned. This was illustrated from the discussion about the Classics. The student may learn mathematics, history and science first and then study Latin; the degree of transfer in this instance might depend, not upon Latin, but upon the previously mastered subject. This is the type of problem to be discussed in this section of our paper.

In order to test experimentally such a proposition as was raised in the preceding paragraph, one factor must be kept constant. Maze A is again the constant activity. One group of subjects first learned Maze B and then was transferred to Maze A. Another group was transferred from C to A, one from D to A, a fourth from E to A, and a fifth from F to A. The varying factor in this situation is the first learned maze; the second acquired problem is kept constant for all of the groups. If the degree of transfer is wholly a function of the second or constant activity, the variations should be only such as can be accounted for in terms of group, or mere chance differences. Should marked variations obtain in the degree of transfer, it can be said that these are due in part to the differences in the character of the first learned problem.

Upon the basis of the foregoing study of transfer, we have been able to make the following conclusions.

1. The nature of the transfer is positive. The learning of one maze has a beneficial effect in the mastery of a subsequent maze situation. We tested the nature of the transfer of both directions between five pairs of mazes with rats, and three pairs with human subjects. We thus secured sixteen separate tests of the nature of the transfer. In all of the sixteen cases the result was positive. . . . The transfer remained positive despite our efforts to produce conditions that would give a negative result.

Transfer is a composite process consisting of both positive and negative elements, and the total result is determined by the predominance of the one or the other of these elements. The total effect was positive although the presence of a negative element was shown to exist. Maze F was designed in relation to Maze A in such a manner that it was possible for us to determine whether certain habits acquired in A exerted a negative effect in the subsequent mastery of F. Subjects with the Maze A experience [who] had greater difficulty in eliminating the tendency to enter section 6-10 in F entered this section much more frequently, and made many more errors in this section, than did those subjects without such an experience. This evidence, we believe, proves the existence of a negative element in the transferred learning of Maze F. In order to produce a negative transfer effect, conditions will have to be arranged wherein the negative element predominates.

The degree of transfer is determined by a number of factors.

- (1) It is in part a function of the nature of the second activity.
- (2) The activities acquired in the first problem determine in part the degree of the transfer.
- (3) The degree of transfer is dependent in part upon the degree of similarity of two maze patterns.

## ii. Memory Materials

*William James*<sup>8</sup>

In order to test the opinion so confidently expressed in the text, I have tried to see whether a certain amount of daily training in learning poetry by heart will shorten the time it takes to learn an entirely different kind of poetry. During eight successive days I learned 158 lines of Victor Hugo's "Satyr." The total number of minutes required for this was 131-5/6—it should be said that I had learned nothing by heart for many years. I then, working for twenty-odd minutes daily, learned the entire first book of *Paradise Lost*, occupying 38 days in the process. After this training I went back to Victor Hugo's poem, and found that 158 additional lines (divided exactly as on the former occasion) took me 151½ minutes. In other words, I committed my Victor Hugo to memory before the training at the rate of a line in 50 seconds, after the training at the rate of a line in 57 seconds, just the opposite result from that which the popular view would lead one to suspect. But as I was perceptibly fagged with other work at the time of the second batch of Victor Hugo, I thought that might explain the retardation; so I persuaded several other persons to repeat the test.

*W. G. Sleight*<sup>9</sup>

The general arrangement of the experiment was as follows:

A series of ten different kinds of tests was first given in order to ascertain, within these limits, the memorizing power of each child at the outset. This is here called the "first cross section." Then followed a practice period of three weeks, during which, for thirty minutes daily, on each of four days per week, various kinds of memory training were carried on. The second test series, consisting of exercises similar to the first, was then taken for the purpose of discovering whether any improvement had occurred. It is here referred to as the "second cross section." This was succeeded by a further period of practice equal in amount and distribution to the first, and making use of the same kind of material and procedure. Lastly, a third series of tests was given in order to ascertain whether there was any corroboration of the previous results. The results of this last series are here named the "third cross section."

<sup>8</sup> From William James, *The Principles of Psychology*, Vol. I. New York: Henry Holt and Company, 1918, pp. 666-667.

<sup>9</sup> From W. G. Sleight, "Memory and Formal Training." *The British Journal of Psychology*, 4, pp. 402, 431, 455.

Three schools, dealt with in succession, were used in these tests—schools referred to in this paper as X, Y, and Z. In each school a sixth standard was made use of, which consisted of 21, 28, and 35 girls respectively. The average age was 12 years 8 months.

TABLE XV  
PRACTICED GROUPS COMPARED WITH UNPRACTICED \*

		Section II Compared with Section I	Probable Error
Dates	Group 2 Poetry practiced	32	25
	Group 3 Tables practiced	(59)	24
	Group 4 Prose Subs. practiced	-6	24
Nons. Sylls.	Group 2 Poetry practiced	(33)	13
	Group 3 Tables practiced	9	13
	Group 4 Prose Subs. practiced	-62	13
Poetry	Group 2 Poetry practiced	(33)	16
	Group 3 Tables practiced	-27	16
	Group 4 Prose Subs. practiced	-7	16
Prose (literal)	Group 2 Poetry practiced	9	21
	Group 3 Tables practiced	-36	20
	Group 4 Prose Subs. practiced	-17	19
Prose Subs.	Group 2 Poetry practiced	-7	33
	Group 3 Tables practiced	49	32
	Group 4 Prose Subs. practiced	(52)	31
Letters	Group 2 Poetry practiced	-24	13
	Group 3 Tables practiced	-3	13
	Group 4 Prose Subs. practiced	(-27)	13

\* The numbers in parentheses are from two to three times the size of their probable errors. A value should be at least three times the size of its probable error to have significance. One can feel certain of a significant difference if the number is four times the size of its probable error. None of the differences in this table is very significant.

### *Summary of Experiment*

(1) There appears to be no general memory improvement as the result of practice, nor any evidence for the hypothesis of a general memory function.

(2) There would seem instead to be a very large number of related and unrelated memory functions, of a more or less complex kind.

(3) The relation which produced transference is not necessarily (a) an external relation perceivable by an external observer, nor (b) a relation perceivable by the learner; but (c) a common factor, of which the individual mind makes use, consciously or unconsciously. The individual's awareness of the usable common element may produce an earlier and greater effect.

(4) The existence of common elements in two memorizing processes, though necessary, is not sufficient. To involve "transfer" the common elements must be separable from the complexes in which they occur. This process of disintegration usually renders the improvement brought about in the related subject smaller than that reached in the practiced subject.

(5) The factors which chiefly make for the transfer of memorizing power are similarities of a fundamental nature, such as specific forms of attention,

imagery, rhythm; in short, similarities of procedure. These will, within limits, vary for the individual mind.

(6) A small change in one of these may be very effective in hindering joint improvement; but a change in material may produce little or no difference. This confirms a distinction often drawn between "immediate" and "prolonged" learning. It has also important pedagogic consequences.

(7) Slight differences in the procedure may bring about a loss of "transfer" and the point where this loss is complete is much nearer than has generally been supposed.

(8) Differences in the midst of great similarity in the mental processes involved may lead to loss of "transfer," or even to reciprocal interference.

(9) Reciprocal interference may also be produced when the mind has to pass from an exercise involving a strong pleasurable feeling to one accompanied by a highly contrasted feeling-tone. This is illustrated in the opposition between the operations involved in logical and mechanical memorizing.

(10) The effects of "indirect" practice do not in general appear to last long beyond the period when practice ceases.

(11) The effects of "direct" practice are in general incomparably greater than those of "indirect" practice.

### iii. Reasoning Materials <sup>10</sup>

*W. H. Winch*

The experiment was undertaken with Standards VIb and V, consisting of 58 girls of an average age of 12 years 3 months on March 31st, 1913. Although this class consisted of two grades or standards, they were taught together under one teacher; the work commenced on Thursday, February 13th, 1913, and ended on Tuesday, July 8th, 1913.

TABLE XVI

SHOWING, SECTION BY SECTION, THE RESULTS IN LOGICAL REASONING OF THE TWO GROUPS COMPARED

Marks in Preliminary Logic Tests	No. of Girls	Practiced Group		Non-Practiced Group		
		Preliminary Average	Final Average	No. of Girls	Preliminary Average	Final Average
Over 45 . . . . .	3	52.0	64.7	3	51.7	53.3
40-45 . . . . .	5	42.0	48.2	5	40.4	36.4
30-40 . . . . .	7	33.1	51.1	7	32.9	39.6
Under 30 . . . . .	5	20.4	39.2	5	21.7	31.4

The first step in the procedure was to obtain an adequate measure of each girl's capacity in logical and arithmetical reasoning. Six sets of logical

<sup>10</sup> From W. H. Winch, "The Transfer of Improvement in Reasoning in School Children." *British Journal of Psychology*, 13, pp. 371, 381.

tests and six sets of arithmetical problems were given at proper intervals. Then the girls were divided into *two equal, parallel and highly correlated groups* on the results of these logical exercises. One of these groups was subsequently trained specially in problematic arithmetic; the other was not. Finally, both groups worked the logical and arithmetical exercises again. Which group did the better, and how much, if any better?

A differential improvement of 24.4 on 16 marks in favor of the group practiced in Problematic Arithmetic is accompanied by a differential improvement of 10.5 on 35 marks in Logical Reasoning. In other words a differential improvement of about 150 per cent in Problematic Arithmetic is accompanied by a differential improvement of about 30 per cent in Logical Reasoning.

#### iv. Ideals

W. C. Bagley<sup>11</sup>

The test consisted simply in insisting on neatness and accuracy in the preparation of arithmetic papers by pupils in the latter half of the third grade. Nothing was said of either neatness or accuracy in connection with the rest of the school work during the period covered by the tests. The papers in language and spelling were, however, saved, and later these were graded and the marks of each pupil compared with his corresponding mark in the arithmetic test. In the subject emphasized (arithmetic) it was found that three weeks' persistent drill upon the preparation of neat and accurate papers resulted in the initiation of very effective habits. The papers were all graded by the same three individuals (the student-investigators). Out of thirteen pupils tested, all showed this improvement in arithmetic save one, whose last paper fell 0.02 behind the first paper in accuracy, although it was improved in neatness. The average gain for the thirteen pupils was 3.69 per cent in accuracy, and 4.9 per cent in neatness (reckoning the increase on the markings of the papers which was upon the ordinary scale of 100). When the language and spelling papers were graded and averaged, however, it was found that there was in every case save one a decrease in both accuracy and neatness. This one pupil, curiously enough, was the exception to the general result in the arithmetic test. The language papers showed an average deterioration of 3.2 per cent in accuracy and 2.1 per cent in neatness; the spelling papers a deterioration of 3 per cent in accuracy and 2.3 per cent in neatness. Whether this deterioration would have continued with a continuance of the same conditions, there is, of course, no means of telling. There is nothing in the results to show that the virtues of the specific training were even beginning to be transferred, and, in view of the marked deterioration, it was thought best to stop the test. The procedure throughout, it should be noted, emphasized only *specific* habits.

<sup>11</sup> From W. C. Bagley, *Educational Values*. New York: The Macmillan Company, 1911, p. 189. Reprinted by permission of the publishers.

W. C. Ruediger<sup>12</sup>

The experiment was pursued, according to the following directions, which were faithfully carried out.

Problem: *Does the ideal of neatness, brought out in connection with, and applied in, one school subject function in other school subjects?*

(1) In the written work of one school subject pay all the attention you can both to the habit and the ideal of neatness. Demand neat papers, having them rewritten when necessary.

(2) Talk frequently *with* the class (not *to*) on the importance of neatness in dress, business, the home, hospitals, etc., connecting it as far as you can with the subject under experiment. Guard against overdoses.

(3) Do *not* bring up the subject of neatness in connection with the other studies of the school. If the pupils bring up these studies, quietly substitute something else. Talk of neatness only in that class, not to the school in general.

(4) Collect one or more papers a week in three or four subjects—language (grammar), arithmetic, geography, history,—one of which is the basis of the experiment. Have name and date on each paper.

(5) Collect at least three papers in each subject before you bring up the matter of neatness.

(6) Do not let the class know that an experiment is being conducted. Do not alter the work of the school in other respects. If uniform exercise papers are not required now, do not make the requirement.

(7) Keep a brief record each day of what was said on neatness, or if nothing was said, as: March 28. We talked of the importance of neatness in—

(8) Make specific note of any other changes in neatness you notice in the pupils, in dress, their desks, etc.

(9) Carry on the experiment for eight weeks.

Papers were collected in three different schools, all of the seventh grade. This grade was chosen because it was thought that the pupils here were old enough to appreciate the significance of an ideal.

Evidently neatness made conscious as an ideal or aim in connection with only one school subject does function in other subjects. Directing our attention to Groups I and III, the most marked improvement of the papers occurred respectively in geography and in arithmetic, the subjects in which neatness was emphasized, but there was unquestionable improvement on the average also in other subjects. In Group I the average grades in geography show an improvement of 5 points, and those in arithmetic and grammar respectively 4 and 3.4 points; while in Group III arithmetic improved 4.5 points, and geography and history respectively 2.9 and 2 points. The number of pupils showing improvement is about the same in all the subjects. In Group II the improvement

<sup>12</sup>From W. C. Ruediger, "The Indirect Improvement of Mental Function Thru Ideals." *Educational Review*, 36, pp. 366-367, 369, 371.



was in no case very marked, but it is significant that the averages show nowhere any decline. . . .

It is gratifying to note, however, that this matter may be made effective, even with children just entering the period of adolescence. This is a powerful argument against the humdrum and mechanical teaching one often sees, teaching that confines itself to the grooves of the subject in hand. Such teaching is out of place everywhere, and certainly during the period of adolescence. To bring to consciousness the general relations of aim and method, and to refer them to the activities of life, not only adds to the interest, but also directly to the results achieved. There is such a thing as the indirect improvement of mental function, even in spheres quite subtle, but the means of such improvement must receive direct attention. And this is the essential point. To expect something to come somehow and in some way is a vain hope. Our results in mental training follow only upon the expenditure of definite and intelligent effort, but with this they seem everywhere commensurate.

#### v. School Subjects

*Thomas H. Briggs*<sup>13</sup>

Through the courtesy of Principal Henry Carr Pearson, conditions as nearly ideal as could be expected for such an extended experiment were provided in the Horace Mann Elementary School. Two seventh grades, consisting of the children of well-to-do parents and of members of the university family, were put at the disposal of the experimenter for three thirty-minute periods a week during six months. During this time the number of children in each grade varied from twenty-five to thirty.

But inasmuch as chance distribution, the ranking of teachers, and the results of the tests used might be inaccurate, a double check was arranged. At the beginning of the school year 1912, all of the children were given the first even set of tests. Then for three months, three periods a week, the children of Room I were taught formal grammar by the experimenter, who for five years had given instruction in the subject in a state normal school; during these three months the children of Room II had work in composition and language. There were then given the second set of tests, after which the conditions were reversed: the children of Room II having formal grammar; those of Room I working with language and composition. Then about the middle of April, 1913, the first set of tests was again given to all the children. By this arrangement, original difference in intellectual abilities mattered little. Not only could the record of Room I with formal grammar for three months be compared with that of Room II without it, and vice versa, but also, so far as each test is comparable with its fellow in difficulty, the record of each room with formal grammar could be compared with the record made by the same room during the three months when it was taught language and composition.

In order that some data might be obtained regarding the effect of gram-

<sup>13</sup> From Thomas H. Briggs, *Teachers College Record*, 14, No. 4, pp. 50, 54, 73, 92.

mar, formal and informal, as it is ordinarily taught, the tests previously described were given to pupils in five public schools in Illinois. These towns were selected so as to afford as fair contrasts as possible. According to general tradition and statements by the respective superintendents, schools A and C emphasize formal grammar in Grade VII; schools B and D do not. There is no information in possession of the experimenter as to exactly what grammar is taught in each school; it is probable that the difference between the kinds is largely a matter of emphasis.

As a result of this experiment it may safely be asserted that these particular children after the amount of formal grammar that they had, do not, as measured by the means employed, show in any of the abilities tested improvement that may be attributed to their training in formal grammar. To this statement there is a possible exception in the tests of Group I.

It is not claimed that some other children with more extended and better teaching of formal grammar may not show in these abilities a superiority to other similar children without this subject; but certainly it is a matter that will admit of less confident assertion than before. Indeed, the burden of proof now rests with those who believe in strengthening mental discipline from formal grammar.

E. L. Thorndike<sup>14</sup>

The experiment to be reported consisted of an examination in May, 1922, and a re-examination in May, 1923, of 8564 pupils who, in May, 1922, were in Grades IX, X and XI. The two examinations were alternative forms of a composite of tests of "general intelligence" that are in common use, plus certain ones added in order to have measures with spatial as well as verbal and numerical content. This composite examination is that described in Vol. V, No. 4 of the *Journal of Educational Research*, April, 1922. Each pupil who took both examinations recorded the subjects which he studied during the school year September 22, 1922, to June 23, 1923; and the gains made in the test were put into relation with the subjects studied. For example, we compare the gains for the pupils who studied English, history, geometry and Latin during the year with the gains for the pupils who studied English, history, geometry and shopwork. If other factors such as initial ability, zeal in taking the examination, and special training on its content are properly equalized or allowed for, the difference in gain represents the difference between Latin and shopwork as taught in these schools in general training or disciplinary value or improvement in "general intelligence," or whatever a gain in such an examination measures.

Let us now consider the results if we deliberately take the most favorable possibility for large differences between studies, by assuming that the gain from the experience of the examination itself is a special practice effect which is due wholly to that experience and is just as great for one program as for

<sup>14</sup> From E. L. Thorndike, "Mental Discipline in High School Studies." *The Journal of Educational Psychology*, 15, No. 1, pp. 1, 94, 97, 98.

another, and has nothing to do with the ability of the mind to think, or is correlated with it negatively, so that 11.9 points should be subtracted from all these estimates. We then have as the effect of the different programs:

- 22½ for the 3 courses in Science and 1 in Mathematics
- 19 for 1 course each in Latin, French, Algebra, and Geometry
- 17 for 1 course each in Arithmetic, Bookkeeping, Stenography and Typewriting
- 10½ for 1 course each in Cooking, Sewing, Dramatic Art, and Physical Education
- 20½ for the best 1 per cent in initial ability
- 1½ for the lowest 1 per cent in initial ability
- 11 for the average white pupil
- 1½ for the average colored pupil

The gain from the more intellectual studies is larger relatively to that from Cooking, Sewing, etc., than it was before, but so also is the gain due to greater initial ability, or to being a white rather than a colored pupil.

It seems to me likely that a considerable fraction of the gain found here is due to the general growth of a year under the stimulation of such a life as a Grade X pupil would lead, in school or out, and to the reaction of his mind to the first and second experiences with the examination. This amount might be set at  $18 \div 2$ . Another fraction of it is due to training in using words, numbers, other symbols, and in dealing with ideas. This fraction varies according to the subjects taken, from somewhere near zero in the case of a program made up of Physical Training, certain forms of Sewing and Typing and the like, up to 8 or 10 in the case of a program made up of an abstract science like Physics, systematic Grammar, Algebra, and the like.

By any reasonable interpretation of the results, the intellectual values of studies should be determined largely by the special information, habits, interests, attitudes and ideals which they demonstrably produce. The expectation of any large differences in general improvement of the mind from one study rather than another seems doomed to disappointment. The chief reason why good thinkers seem superficially to have been made such by having taken certain school studies, is that good thinkers have taken such studies, becoming better by the inherent tendency of the good to gain more than the poor from any study. When the good thinkers studied Greek and Latin, these studies seemed to make good thinking. Now that the good thinkers study Physics and Trigonometry, these seem to make good thinkers. If the abler pupils should all study Physical Education and Dramatic Art, these subjects would seem to make good thinkers. These were, indeed, a large fraction of the program of studies for the best thinkers the world has produced, the Athenian Greeks. After positive correlation of gain with initial ability is allowed for, the balance in favor of any study is certainly not large. Disciplinary values may be real and deserve weight in the curriculum, but the weights should be reasonable.

H. O. Rugg<sup>15</sup>

The monograph presents an experimental investigation of the effect of a semester's study of descriptive geometry upon specific abilities in the mental manipulation of spatial elements, (a) of a strictly geometrical character; (b) of a quasi-geometrical character; (c) of a nongeometrical character.

The *general procedure* was to study "transfer" by means of a detailed determination, through classroom experiment, of the spread of training obtained in a specific school course of study.

Four hundred and thirteen college students in the University of Illinois, ranging in age from seventeen to twenty-six years, served as *subjects*. Three hundred and twenty-six freshmen engineering students acted as the *training group*, eighty-seven juniors and seniors of the college of liberal arts and sciences made up the *control group*. Both the training and the control group took the *test series* in February and June. Only the training group took the *training course*, which was the regular University of Illinois course of study offered to engineers in *descriptive geometry*. In order to be able to *isolate the cause of any residual gains* that might possibly be found favoring the training group, this group was further subdivided into seven *subsections*, each of which was composed of those students *pursuing like courses of study*. As descriptive geometry was the only course pursued by all the subjects, statistical study could be made of the relative training value of the other courses pursued by the subjects.

The *test series* consisted of six written class tests for ability in the mental manipulation of spatial elements; Numbers 1, 2, and 6 involved nongeometrical elements, Number 3 involved quasi-geometrical elements, and Tests 4 and 5 involved strictly geometrical elements. Preliminary "laboratory" tests were given during the period September, 1912, to January, 1913, to forty-one subjects, and upon this basis the final tests used in this investigation were constructed. The final tests were given in February and in June, 1913 and 1914. They were given to the subjects grouped in the regular teaching sections of the department of general engineering drawing, with careful general and specific directions and with classroom conditions as nearly normal as possible.

*Results of the investigation.*—(1) Statistics of initial efficiency of the two groups reveal the *training group* as the superior in all tests. Thus a residual gain in favor of the training group cannot be ascribed to a larger possible range of progress because of a lower initial efficiency.

(2) *Group efficiency.*—In all tests the median gain in attainment of the entire training group exceeds that of the entire control group in both "Attempts" and "Rights." The residual gains in favor of the training group are progressively greater as one proceeds from the nongeometrical tests (Numbers

<sup>15</sup>From H. O. Rugg, "The Experimental Determination of Mental Discipline in School Studies." *Educational Psychology Monographs*, No. 14, pp. 1, 2, 3, 4, 5.

1, 2, and 6) in which the average residual gain is 7 per cent to the quasi-geometrical test (Number 3) in which the residual gain is 20 per cent, and to the strictly geometrical tests (Numbers 4 and 5) in which the residual gain is 31 per cent.

(3) *Individual efficiency*.—(a) *Number of subjects gaining*. "Attempts": in all tests, approximately 50 per cent more of the training subjects gain than of the control subjects. "Rights": considerably over half again as large a proportion of the training group gain as of the control group. (b) *Amount of gain*. In both "Attempts" and "Rights" the training group gains approximately 20 per cent more than the control group and makes a progressively greater gain as one proceeds from the tests with non geometrical elements to the tests with quasi- and with strictly geometrical elements. (c) *Number of tests in which gains were made*. "Attempts": 67.8 per cent of the training group and 42.5 per cent of the control group gain in 60 per cent or more of the tests taken. "Rights": 72.7 per cent of the training groups and 31 per cent of the control group gain in 60 per cent or more of the tests taken. The average per cent of tests for which gains were made is, for the training group: "Attempts" 63 per cent; "Rights" 64.5 per cent; for the control group: "Attempts" 49 per cent; "Rights" 40 per cent. In general, the training group gains in a distinctly larger proportion of the tests taken than does the control group.

(4) *Effect of the training upon students of different grades of scholastic ability*.—When the students are grouped on a basis of scholastic ability in disciplinary or "problem" courses (such as mathematics courses), the semester's training received in descriptive geometry is found to "spread" more effectively with the high-grade than with the low-grade students. When the students are grouped on a basis of scholastic ability in English and the modern languages, the training is found to be equally effective with all grades of scholastic ability. This difference suggests the possibility that the "method of transfer" is to be defined largely in terms of conceptualizing and organizing abilities.

Warren W. Cox<sup>16</sup>

The phase of the whole investigation herein reported is the influence which Latin has and can have upon the spelling of English words. The study falls naturally into two divisions: (1) the extent to which Latin, as now taught, is improving the spelling of English words and (2) the best methods and material which can be used to produce a maximum improvement.

In order to determine to what extent Latin, as now taught, influences the spelling of English words, fifty-eight schools located in different parts of the United States were asked to co-operate in a general survey. The Buckingham-Coxe Spelling Scale, which was prepared especially for this study, was given in these schools to pupils in the English classes of the year in which Latin

<sup>16</sup> From Warren W. Cox, "The Influence of Latin on the Spelling of English Words." *Journal of Educational Research*. 9, 1924, No. 3, pp. 223, 224, 225, 226, 232-233.

was begun. Thus, pupils who were beginning Latin, as well as those who were not taking Latin were tested. A second form of the test was given at the middle of the year to measure the gain made during the first semester, and a third form was given at the end of the year to measure gains made during the year.

After the papers from the fifty-eight schools had been corrected, they were so tabulated as to show the gains made during the semester and during the year. In order to compare the spelling gains made by the Latin pupils with the gains made by the non-Latin pupils, it was necessary to equate the two groups on the basis of initial spelling ability. When this was done, the Latin pupils showed an average gain for the year of 3.6 words; the non-Latin pupils, a gain of 2.6 words. There is thus an advantage for the Latin pupils of one word. These statements refer to the twenty-five words derived from Latin studied somewhere in the high school course. A comparison of the gains made on Latin words for the semester and for the year shows that most of the gain was made during the first semester. On words of non-Latin origin, the Latin pupils gained 0.2 of a word, while the non-Latin pupils gained 0.1 of a word.

The conclusion, therefore, is warranted that in general, Latin as now taught does improve the spelling of English words of Latin derivation, but does not assist in the spelling of words of non-Latin origin. Nearly all of this improvement takes place in the first semester.

A controlled experiment was carried out to determine whether the amount of gains could be increased by conscious efforts to relate Latin to English spelling, and, if so, what methods produced the greatest gains.

Several groups of classes were organized, each following a slightly different procedure. The groups were as follows:

*Latin control group (Group I).*—This group was composed of pupils beginning Latin. They followed the methods usually prescribed by the school, except that the teachers were cautioned not to relate Latin to the spelling of English words.

*Latin experimental Alpha group (Group II).*—The pupils of this group were of the same grade as those in the preceding group. This group followed a definite teaching method and used definite practice material. The method consisted in pointing out the similarity between the Latin word and its derivative. The teachers were cautioned not to develop any rules or principles, which would show the relation between the Latin word and its derivatives. The material used consisted of 153 English words, all of which were derived from Latin found in the pupil's textbook.

*Latin experimental Beta group (Group III).*—This group used definite methods and material. The material was the same as that of the preceding group, but the methods involved the development of principles. . . .

*English (non-Latin) control group (Group IV).*—These classes did not take Latin and no special effort was made to teach spelling other than that required by the school in which the class was taught.

*English (non-Latin) experimental group (Group V).*—These classes used the same material as that prescribed for the two Latin experimental groups. The method which was employed did not presuppose any Latin, but followed the best current practice in the teaching of spelling.

All five groups were given the Buckingham-Coxe Spelling Scale at the beginning of the experiment in November, 1922, again in February, and in May, 1923. In addition, a supplementary test was used consisting of one hundred words derived from Latin words usually studied in the first year. This test was known as the Ungraded Spelling Test and was given at the beginning of the experiment and repeated at the end.

As a result of the study, it is possible to evaluate several methods of teaching as to their effect on the spelling of English words. It is also possible to evaluate several types of words with respect to the help which Latin can contribute to their spelling. As to the methods, we can say that Latin study, even with no special emphasis upon its relation to English spelling, does have an appreciable effect. When the similarities between Latin and English spelling are pointed out, the spelling results are still further increased, but the greatest results can be achieved when we develop rules which govern the spelling of Latin derivatives. Further, this last method produces the least interference with the spelling of non-Latin words.

As to the types of words which Latin study can influence most widely, we can say that there is a slight interference with words of non-Latin origin, that there is a decided gain with words derived from Latin words studied somewhere in the high school, that the gain is still greater with words derived from first-year Latin, and that the greatest gain is produced on words which have been included in the practice material.

The results given above are not changed when we eliminate the influence of intelligence and the personal qualities of the teacher. In a great many cases we were able to control these influences and no appreciable change was found.

*Clifford Woody*<sup>17</sup>

The purpose of this report is to set forth the results of an investigation to measure the influence of the teaching of first-year French on the acquisition of English vocabulary.

After developing a suitable instrument of measurement, the real investigation for measuring the influence of the teaching of first-year French on the acquisition of English vocabulary was undertaken. The following cities participated in the investigation: Ann Arbor, Battle Creek, Detroit, Flint, Grand Rapids, Kalamazoo, Milwaukee, Pontiac, Saginaw, and Wyandotte. They gave the tests to three distinct groups of pupils: those who were just beginning

<sup>17</sup> From Clifford Woody, "The Influence of the Teaching of First-Year French on the Acquisition of English Vocabulary." *Studies in Modern Language Teaching*, 17, pp. 149, 152-153, 178-179.

the study of French and who were not taking and had not previously studied any other foreign language; those in similar grades with similar opportunities for learning who were beginning the study of Latin but who were not taking and had not previously studied any other foreign language; those in similar grades with similar opportunities for learning who were not taking any foreign language and who had at no time studied any foreign language. These three groups will be referred to throughout this report as the "Beginning French," "Beginning Latin" and "No Language" groups.

In all tabulations presented all groups of pupils tended to make some gain in the acquisition of English vocabulary. However greater gains were made on the French derivatives than on the non-French derivatives. The three main language groups ranked in order of the superiority in the gains on the French and non-French derivatives are: "No Language," "Beginning Latin," and "Beginning French." The superiority of the "Beginning Latin" and the "No Language" group is all the more significant because this superiority was manifested in part at least on a test which included derivatives selected from the commonly used French roots. That portion of the test consisting of French derivatives was certainly made in such a manner as to favor the group of pupils studying French, but even on this part of the test, pupils studying beginning French made smaller gains than those pupils studying beginning Latin or those not taking any language at all. When consideration was given to the influence of sex, mental ability, or size of the initial score it was found that none of these factors tended to change the general tendency.

The situation portrayed should be of great interest to the teacher of French, but it should be understood that the conclusions reached refer merely to the conditions as they exist in the schools under consideration. A different emphasis in teaching in either of the groups might change the nature of the findings. But with the situation as it is, the teachers of French must meet the challenge. They should first decide whether the acquisition of English vocabulary is one of the aims to be stressed in the teaching of French, and if they decide it is, they should devise methods of teaching which will result in a better realization of the aim.

#### vi. Summary of Experimental Results

*Pedro T. Orata*<sup>18</sup>

The excerpts above are taken from a few of the many studies that have been made with the transfer problem. Certain results were found in the studies that have been sampled. An excellent summary of the results of all the experiments with the problem of transfer is presented in the following table. The trends resulting from the experimental attack on the problem are readily surmized from such a table.

<sup>18</sup> From Pedro T. Orata, "The Transfer of Training and Educational Pseudo-Science." *The Mathematics Teacher*, 28, No. 5, p. 268.



TABLE XVII

STATISTICAL RESULTS OF TRANSFER EXPERIMENTS FROM 1890 TO 1935

<i>Findings</i>	<i>Number of Studies</i>			<i>Per Cent</i>
	Lab.	Class	Total	1890-1935
Considerable transfer	24	23	47	28.0
Appreciable transfer	35	45	80	48.0
Very little transfer	2	13	15	9.0
Finds no transfer	1	5	6	3.6
Finds interference	4	1	5	3.0
Transfer and interference	10	2	12	7.2
Transfer varies with expt'l condition	3	6	9	5.4
Grand Total	79	96	175	104.2
Duplication	8		8	4.2
Net Total	81	96	167	100.0

*L. W. Webb*<sup>19</sup>

On the basis of all of this experimental evidence one can conclude with confidence that positive transfer does take place. This fact has been proved again and again by many experimentations under varying conditions. One should be careful at this point, however, and not jump to the conclusion that formal discipline has been proved experimentally. It must be remembered that absence of transfer and negative transfer have been proved in several experiments. Furthermore, the degree of positive transfer varies from a very slight amount to 92.9 per cent. It has been estimated that 5.4 per cent of the experiments prove that the degree of transfer varies with the conditions under which the experiments were made. These last-maintained facts hardly fit in with the theory of formal discipline.

With all of these facts before him, no intelligent teacher should be willing to assume tacitly that the subject he teaches is in and of itself having the wonderful effects which formal discipline assumed that certain subjects do have. On the other hand, the teacher should be concerned with whether or not his subject has large or small values to students in meeting other situations of life, has no value, or may even hinder the students in solving certain problems. Such considerations force one to raise the question of the possibility of improving the learning conditions of the classroom so as to increase the degree of positive transfer of the subjects taught. A number of experiments make some contribution to the solution of this problem.

<sup>19</sup> From L. W. Webb, "The Transfer of Training," *Educational Psychology* (Edited by Charles E. Skinner). New York: Prentice-Hall, Inc., 1936, p. 337.

## 2. CONDITIONS OF IMPROVING TRANSFER

*Charles H. Judd*<sup>20</sup>

Two groups of pupils in the fifth and sixth grades were required to hit with a small dart a target which was placed under water. The difficulty of hitting the target arises, of course, from the deflection which the light suffers through refraction. The target is not where it seems to be, and the boy must fit his aim with the dart to conditions which differ from those which he knows in ordinary life. The amount of refraction and the consequent displacement of the target are capable of definite theoretical explanation before one throws the dart. In this experiment one group of boys was given a full theoretical explanation of refraction. The other group of boys was left to work out experience without theoretical training. These two groups began practice with the target under twelve inches of water. It is a very striking fact that in the first series of trials the boys who knew the theory of refraction and those who did not gave about the same results. That is, theory seemed to be of no value in the first tests. All the boys had to learn how to use the dart, and theory proved to be no substitute for practice. At this point the conditions were changed. The twelve inches of water were reduced to four. The difference between the two groups of boys now came out very strikingly. The boys without theory were very much confused. The practice gained with twelve inches of water did not help them with four inches. Their errors were large and persistent. On the other hand, the boys who had the theory, fitted themselves to four inches very rapidly. Their theory evidently helped them to see the reason why they must not apply the twelve-inch habit to four inches of water. (Note that theory was not of value until it was backed by practice, but when practice and theory were both present, the best adjustment was rapidly worked out.)

*Herbert Woodrow*<sup>21</sup>

This experiment deals with the possibility of teaching a general technique of memorizing. Its object is to show that training in certain kinds of memorizing may be given in two such widely different ways that in the one case, the individual will benefit little or not at all and, in the other case, enormously, when he turns to new kinds of memorizing.

Three groups of subjects were required in the experiment. These will be designated the control, practice, and training groups. The control group, consisting of one hundred and six university sophomores, was given no practice or training in memorizing, but was tested in six different forms of memorizing at the beginning and end of a period of four weeks and five days. The two other groups, the practice and the training groups, numbering thirty-four

<sup>20</sup> From Charles H. Judd, "The Relation of Special Training to General Intelligence." *Educational Review*, 36, No. 1, pp. 36-37.

<sup>21</sup> From Herbert Woodrow, "The Effect of Type of Training on Transference." *Journal of Educational Psychology*, 18, No. 3, pp. 160, 161, 164, 170-171.

and forty-two, respectively, were given at the beginning and end of this period the same tests as the control group.

The primary object of the present investigation is not to study the results obtained with the end tests given the control group, but to compare the "practice" group with the "training" group. It is important, therefore, to record exactly the procedure employed with these two groups. They were both given practice, between the initial and final end tests in two forms of memorizing, namely, learning poetry verbatim and learning nonsense syllables in columns of pairs. To the practice group this drill was given, as has been customary in experiments on transference, in a routine fashion without any explanation of principles, discussion of methods, or comparison of the methods to be used in different kinds of problems. To the training group some practice was given with the same materials utilized by the practice group, but, in addition, instruction was given in the technique of memorizing. The total time consumed by each group, apart from the end tests, was 177 minutes divided into periods occurring twice a week for four weeks. The periods varied from nineteen to twenty-eight minutes and averaged twenty-two minutes. Of the total time, the practice group spent ninety minutes in memorizing poetry and eighty-seven minutes in memorizing nonsense syllables. The members of the training group divided their time as follows: for a total of seventy-six minutes, they listened to an exposition of the technique of memorizing, including rules and illustrations of how these rules should be applied; for seventy-six minutes, they memorized poetry; and for twenty-five minutes, they studied nonsense syllables. In the practice periods, both groups were motivated by the assurance of the experimenter that such work would improve their memory. In the case of the training group, however, all the practice in memorizing was done with the purpose of attempting, as far as possible, to apply the rules that had been learned. Nothing was said to the practice group as to how they should memorize, except that they were told to memorize by heart, and when they finished one selection to begin another.

The training group shows results which stand in striking contrast with those obtained with the practice group. The improvement shown by the training group in the final tests is, in the case of every end test, much greater than that of the control group. The difference in the gains of the two groups is in no case less than six times the probable error of the difference. The superiority of the gains of the training group over those of the practice group is hardly less pronounced. The differences in their gains, which are in all cases in favor of the training group, vary from 4.7 to 17.0 times the probable errors of those differences.

The facts given establish very definitely certain conclusions. They show unequivocally that the training group did much better than the practice group in every one of six end tests, which were related to each other only to the extent of an average intercorrelation, after correction for attenuation, of 38.3 per cent. The percentage of gain in the end tests averaged 31.6 higher for the training group than for the control group. This greater gain on the part of

the training group was obtained in spite of the fact that drill in memorizing was given to the training group with no other material than that employed with the practice group. It was produced by using the drill material primarily as material with which to conduct practice in proper methods of memorizing and, further, by explaining these methods and calling attention to the ones which should be employed when new kinds of memorizing were undertaken. In short, the experiment shows that in a case where one kind of training—undirected drill—produces amounts of transference which are sometimes positive and sometimes negative, but always small, another kind of training with the same drill material may result in a transference, the effects of which are uniformly large and positive.

While the investigation that has been described has taken the form of a laboratory experiment, it is hoped that it shows sufficient analogy to schoolroom situations to have a definite bearing upon education. For example, it might be found that the study of some particular subject, such as algebra, produces little improvement in ability to reason about problems in other subjects. According to the present results, however, such findings would tell little with respect to the possible value of the aforesaid subject as a medium for the giving of drill in the technique of reasoning, or of the results which could be obtained by its study under a teacher who so used it.

*James Robert Overman*<sup>22</sup>

The investigation here reported was planned to study the effect of instruction on three types of examples in two-place addition upon the pupils' ability to handle closely related types in three-place addition and in two- and three-place subtraction, and to determine whether the amount of transfer is a function of the method of teaching.

More specifically the problem was to determine whether the amount of such transfer can be increased by helping the pupils consciously to generalize the process and formulate, from the three types taught, a general method of procedure applicable to the related types; by rationalizing the process, that is, by considering the underlying principles; and by a combination of generalization and rationalization.

In order to make it possible to study the effect upon transfer of generalization, rationalization, and generalization and rationalization combined, the grades were divided into four groups, each group being taught by a different method. At the conclusion of the experiment the pupils were separated into groups of four, each taught by a different method. At the conclusion of the experiment the pupils were separated in groups of four, each taught by a different method, and matched for sex, mental age, teachers' estimate of general ability and score made on the preliminary testing.

<sup>22</sup> From James Robert Overman, *An Experimental Study of Certain Factors Affecting Transfer of Training in Arithmetic*. Baltimore: Warwick and York, Inc., 1931, pp. 31, 32, 120, 121.

*Summary of results.*—The effect of the instruction and practice given on certain specific types of examples was not confined to those types but spread, or transferred, to related types. Some spread occurred in the cases of 99.1 per cent of all the pupils. The mean transfer, for the group taught by the most favorable method, was 72.4 per cent of complete transfer.

On the types of examples where the generalization and rationalization would naturally be expected to be most effective, namely on those involving the placing of numbers having different numbers of digits, there were fairly large and reliable differences between the methods. On examples of this type, the generalization alone increased the transfer by 45.1 per cent, the rationalization alone increased it by 15.5 per cent and the generalization and rationalization combined increased it 36.9 per cent. It appears, therefore, that aid in generalizing the process was an effective method of increasing transfer with pupils in the second grade.

The generalization and rationalization were most effective in producing transfer with pupils in the highest third of the group with respect to mental age.

*Mattie F. Dorsey and Thomas Hopkins*<sup>28</sup>

The purpose of this paper is to report the results of an experiment to determine the variations in the amount of transfer depending upon readiness to act as built up by suggestion given at the time of performance. The experiment consisted of three separate divisions, or cases, in each of which the equivalent group technique was employed. To each group of a case was furnished an identical situation to which it was possible to transfer elements of previous experience. To the experimental group was given the suggestion that such experience might be used in meeting the new situations, whereas no such suggestion was given to the control group. Identical tests were given to both groups. The customary training period used so widely in transfer experiments was unnecessary since the members of each group in each case had been taught the same basic materials and methods by the same individual. It was assumed that transfer would take place in both groups and that whatever difference should occur in performance between the two groups of a case would be due primarily to the influence of the experimental factor.

(1) This study reports group and individual data from an equivalent group experiment with college freshmen to determine the amount of transfer depending upon readiness to act as built up by suggestion given at the time of performance. The experiment consisted of three separate divisions or cases. Case I involved the transfer of *method of study* to the study of a particular kind of material. Case II involved a transfer of *knowledge* from a subject to an allied field containing new and old materials. Case III involved a transfer of *skill* in the manipulation of ideas from the situation in which it was learned to a new one outside of the field.

<sup>28</sup> From Mattie F. Dorsey and Thomas Hopkins, "The Influence of Attitude upon Transfer." *Journal of Educational Psychology*, 21, No. 6, pp. 410, 416-417.

(2) Total scores, mean scores, per cent of one group overlapping the mean of the other, and the experimental coefficient in all three cases indicated marked superiority in the performance of the experimental over the control groups.

(3) Standard deviations indicated that with Cases I and II the experimental factor tended to produce greater individual differences and spread the performance of the experimental group over the control group. Exactly the opposite condition was found in Case III and may be due to a larger number of cases and different types of material or to more reliable methods of equating.

(4) Since the experimental and control groups in each case were equated on the basis of intelligence, the superiority of the experimental group over the control group cannot be due to ability, but must result from some other influence such as readiness to act.

(5) Since the two groups in each case were given the same basic training in the factor to be transferred, the difference in amount between the two groups must be due to the presence of some factor other than previous training.

(6) The mere presence of a possible transfer situation would produce some, but not the maximum amount of transfer.

(7) The amount of transfer both with and without the readiness factor is an individual matter. Paired subjects having the same ability, the same previous training, the same suggestion or lack of suggestion, and the same test differ in the amount of transfer.

*Evelyn B. Moore*<sup>24</sup>

The study here reported is an attempt to test an assumption that is implied in all discussions of science teaching at the junior high school level: that a scientific attitude is developed by a knowledge of scientific facts and varies directly with such knowledge. In other words, it is assumed that one's opinion with regard to natural phenomena will be sound or unsound to the extent that one's knowledge of scientific principles is complete.

The procedure employed consisted of the following steps:

- (1) Testing a trial group by means of the Otis Group Intelligence Scale in order to—
  - (a) Determine whether or not the trial group represented a normal sampling.
  - (b) Determine the correlation between the tests used in this study and a standardized test of general intelligence.
- (2) Collecting situations from everyday life and constructing tests of judgment and of fact regarding these situations.
- (3) Checking such items of the tests as could be eliminated without seriously reducing the reliability of the tests.

<sup>24</sup> From Evelyn B. Moore, "A Study of Scientific Attitudes as Related to Factual Knowledge." *The School Review*, 38, No. 5, pp. 379, 380-381, 386.

- (4) Administering the tests of judgment and of fact in tentative form to the trial group. The scores were used for two purposes:
  - (a) To eliminate from each test those items which were answered either correctly or incorrectly by all subjects in an effort to reduce the number of items.
  - (b) To divide the remaining items into two groups of equal difficulty, which were to be given a week apart to check their reliability and the effect of practice.
- (5) Regrouping the items according to the findings.
- (6) Administering the revised forms of the tests to the trial group to check the equivalence of the forms.
- (7) Administering the final draft of the tests to 120 subjects from six groups as subsequently described.
- (8) Scoring and recording the results.
- (9) Studying the findings to determine the differences between men and women, between the different groups of students, between those who have studied science and those who have not, between those who are interested in science and those who are not, and between those who are "superstitious" and those who are not, and to determine if possible the factors that are most commonly associated with "rational inference."
- (10) Presenting at least one case study from each group to indicate the reasons why those who know much or little science should make good or bad inferences regarding situations involving scientific principles.

The findings of this study seem to justify the following conclusions:

- (1) That phase of the scientific attitude which is known as the ability to distinguish a valid explanation for a given situation in daily life from explanations less valid is clearly related to a knowledge of scientific facts and principles.
- (2) One's ability to apply knowledge is not in direct proportion to one's knowledge of facts. Knowledge may be a result of superficial reading or rote memory, or one may be able to apply effectively a limited knowledge of facts.
- (3) Other factors tend to influence the relation between a scientific attitude and factual knowledge:
  - (a) The study of science for at least a year increases the proportion of facts which can be applied.
  - (b) The presence of prejudice or of superstition diminishes the degree of application of the facts known.
  - (c) Scientific reading increases both the knowledge of facts and the extent to which it is applied.
  - (d) Superior intelligence, general educational training, and experience increase the knowledge of facts and the ability to apply it.
  - (e) Scientific interests stimulate the acquisition of a knowledge of facts but do not appreciably affect the ability to apply it.
- (4) Sex differences have little evident effect on the amount of factual knowledge or the ability to apply it.

- (5) No person is able to apply all the facts he knows. However, when the facts are known, the fewest errors are made in the situations in which a person has had the most experience. It follows, then, that the methods employed in the teaching of science should present facts and principles in relation to as many of the important situations in daily life as possible.

#### IV. How Does Transfer Take Place?

A large number of experimenters on the problem of transfer of training offer suggestions as to how transfer takes place. Several theories have become prevalent in explanation of the causes of transfer.

*E. L. Thorndike*<sup>25</sup>

One mental function or activity improves others in so far as and because they are in part identical with it, because it contains elements common to them. Addition improves multiplication because multiplication is largely addition; knowledge of Latin gives increased ability to learn French because many of the facts learned in the one case are needed in the other. The study of geometry may lead a pupil to be more logical in all respects, for one element of being logical in all respects is to realize that facts can be absolutely proven and to admire and desire this certain and unquestionable sort of demonstration. . . .

These identical elements may be in the stuff, the data concerned in the training, or in the attitude, the method taken with it. The former kind may be called *identities of substance* and the latter, *identities of procedure*.

*W. C. Bagley*<sup>26</sup>

In the "Educative Process" after reviewing the experimental evidence, then available, the writer suggested that the transfer of the results of training could be accomplished, in some measure, through a process of judgment. That is, functions may be improved by the application of *ideas* or procedure and method gained in other fields: or, inasmuch as the effective employment of any *idea* as a goal or aim of adjustment depends, as has been suggested in previous sections, upon the emotional coloring of the idea, it is better to use the term *ideal* to designate the agency that usually accomplishes the transfer. For example, the close thinking that is trained in mathematics may come to function in other fields—in political economy or in psychology or even in the work of practical, everyday life—provided that one has gained from the study of mathematics a certain respect or perhaps even reverence for the rigid, clear-cut mathematical method. If mathematics is taught, how-

<sup>25</sup> From E. L. Thorndike, *Educational Psychology, Briefer Course*. New York: Teachers College, Columbia University, 1914, pp. 276-277.

<sup>26</sup> From W. C. Bagley, *Educational Values*. New York: The Macmillan Company, 1911, pp. 190-191. Reprinted by permission.



ever, in a purely mechanical fashion, with no attempt to make its methods conscious to pupils or to give them an *appreciation* of the virtues of the method, the "spread" will manifestly be an uncertain quantity. Indeed, one may very easily be prejudiced against a method by poor teaching, and so resist any temptation to apply it to other situations.

*Charles H. Judd*<sup>27</sup>

All the findings of psychology and all the experiences of the schools contribute to the conclusion that the highest achievements of the mind are its general ideas and its general methods of intellectual attack. Those forms of mental activity which are described by the terms "abstraction," "comparison," "analysis," "judgment," and "reasoning" are the unique and characteristic marks of distinction between the mental life of man and that of the lower animals. Abstraction is not a particular item of experience; it is a method of thought. The foregoing chapters of this book have repeatedly pointed out the fact that in all the advanced subjects abstraction is a common and highly important method of intellectual procedure. We are justified in concluding the discussions of particular subjects and their psychology with the statement that the highest powers of the mind are general, not particular, that mental development consists not in storing the mind with items of knowledge nor in training the nervous system to perform with readiness particular habitual acts but rather in equipping the individual with the power to think abstractly and to form general ideas.

When the ends thus described are attained, transfer of training, or formal discipline, has taken place because it is the very nature of generalization and abstraction that they extend beyond the particular experiences in which they originate.

*P. T. Orata*<sup>28</sup>

With reference to the *agencies* of transfer the results obtained in the 1927 study have been confirmed by the present investigation. In round figures 70 per cent of the studies support the proposition that the effect of practice is general, and that therefore transfer takes place most effectively through *conscious generalization*, whereas about 30 per cent may be classified as supporting the theory that practice is specific and that transfer therefore takes place through *identical elements*. Not an insignificant number of the investigators support both views of *identical elements* and *generalization*. As the saying goes, "When in doubt believe in both."

Several studies have been made to "test" directly or indirectly, both of Thorndike's theory of *identical elements* and Judd's theory of *generalization*. It seems fairly conclusive from the results of studies of both human and

<sup>27</sup> From Charles H. Judd, *Psychology of Secondary Education*. Boston: Ginn & Company, 1927, p. 441.

<sup>28</sup> From P. T. Orata, "The Transfer of Training and Educational Pseudo-Science." *The Mathematics Teacher*, 28, No. 5, pp. 267, 268, 269.

animal learning that the mere presence of identical elements does not guarantee that transfer takes place. On the other hand, perfect transfer may take place between two situations which are apparently unrelated. This all goes to show as we have tried to point out in the 1927 survey that transfer may or may not take place depending, not upon the presence or absence of hypothetical identical elements, whether they be in terms of content, procedure or even ideal, but upon the extent to which the investigator succeeded in setting up the experiment so as to provide conditions that are favorable to transfer. It is safe to conclude, therefore, that from the standpoint of the teacher and the school in general, the solution of the problem of transfer of training is *to train for transfer*.

B. H. Bode<sup>29</sup>

At this point our discussion of thinking trenches on the problem of the transfer of training. From our present standpoint this problem centers on the development of concepts. Mechanical habits, i.e., responses cultivated in isolation, do not seem to facilitate transfer, but may even provide obstacles to transfer. If the habits of an automobile driver are once thoroughly mechanized, the change to a different type of gearshift is likely to be attended with some difficulty. But when our habits interpenetrate and form systems of response, which on higher levels grow into concepts, we get the flexibility and adaptability that we have in mind when we speak of transfer of training. This is simply to say that transfer takes place through meanings, or that transfer of training is just another name for intelligence.

The moral of all this is that if we devote ourselves to the proper development of concepts, transfer of training will cease from troubling. We have had a problem of transfer because we have failed to develop concepts so as to give them proper usefulness outside of the classroom. The fact that the problem of transfer is, in the first instance, a "school problem" raises the suspicion that we have this problem on our hands because of the cleavage between the school and the life outside of the school. In the world of everyday affairs we do not seem to be troubled so much by the problem of transfer. But a school subject which, in Judd's language, is "so organized that it rotates around its own center" does not carry over, and this calls for explanation. The remedy lies obviously in the reorganization of the curriculum and teaching method so as to remove the cleavage. The problem of transfer is symptomatic of a defect in our educational aims and ideals. If we can bring the school into right relations with the life outside of the school, the problem of transfer will take care of itself.

<sup>29</sup> From B. H. Bode, *Modern Educational Theories* New York: The Macmillan Company, 1927, pp. 202-203.

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## EXERCISES

1. Make a list of reasons given by teachers, parents and friends why one should study Latin and geometry. Which of these reasons are valid? What, after all, determines the validity of some of the reasons assigned?
2. Distinguish carefully between the Doctrine of Formal Discipline and the fact of transfer of training.
3. What contribution in this field was made by each of the following: Bagley, James, Judd, Thorndike, Rugg, and Orata?
4. How is transfer explained?
5. Assume that learning one activity or subject is influenced positively or adversely by every previous activity or subject. Some previous learnings effect greater saving in subsequent learnings than others. What factors determine the amount of transfer?
6. Evaluate the following statements:
  - (a) Generalizations must be made into ideals to insure transfer.
  - (b) The transfer problem centers largely around the choice of certain subjects of study.
  - (c) Insight into relations is the real means of securing general training.
7. How is transfer influenced by the following?
  - (a) Partial learning of a subject.
  - (b) Intelligence of the learner.
  - (c) The attitude of the learner.
8. Cite illustrations of negative transfer from classroom or life situations.
9. Describe in detail an experimental technique for studying the transfer value of a given subject or activity into another.
10. Compare the relative value of the conventional and the so-called progressive or activity school from the standpoint of transfer.

## CHAPTER XVII

### INDIVIDUAL DIFFERENCES <sup>1</sup>

*Verner Martin Sims, University of Alabama*

#### I. Introduction

That human beings differ in physique, mental ability, personality, educational achievements, and in all other characteristics, has long been known. But the experimental and quantitative work done by the psychologists of the last fifty years or so has led to more exact information as to the extent, the nature and the causal factors involved in these differences. Recognition of the significance of these findings has led to serious efforts on the part of more progressive school men to adapt better the curriculum to the nature and needs of individual pupils.

In this chapter we shall attempt to develop some appreciation of the extent to which school children, even those within a grade, do differ; to present some of the basic facts concerning the nature of the differences; and, finally, to show how the problem of adjusting to these wide differences is being met in schools of today. In general psychology and in theoretical treatises on individual differences the emphasis is placed on the nature and causes of the variations, but here major attention is given to the problem of how the schools can make adequate provisions for the differences which exist.

#### II. The Nature and Extent of Individual Differences

##### I. DIFFERENCES IN THE INTELLECTUAL CAPACITY OF MEN <sup>2</sup>

*Francis Galton*

There can hardly be a surer evidence of the enormous difference between the intellectual capacity of men, than the prodigious differences in the numbers of marks obtained by those who gain mathematical honours at Cambridge. . . . There are between 400 and 450 students who take their degrees in each year, and of these, about 100 succeed in gaining honours in mathematics, and are ranged by the examiners in strict order of merit. About the first forty of those who take mathematical honours are distinguished by the title of wranglers, and it is a decidedly creditable thing to be even a low wrangler; it will secure a fellowship in a small college. . . .

<sup>1</sup> The following texts contain excellent discussions of the topic: Skinner and Collaborators, *Educational Psychology*, Chapter XV by Dr. F. S. Freeman; Griffith, *An Introduction to Educational Psychology*, Chapter XVI; Bolton, *Everyday Psychology for Teachers*, Chapter IV; Collings and Wilson, *Psychology for Teachers*, Chapter XXIV; Cameron, *Educational Psychology*, Chapter V; Eurich and Carroll, *Educational Psychology*, Chapters IX, X, and XIV; Gast and H. C. Skinner, *Educational Psychology*, Chapter VI; Gray, *Psychological Foundations of Education*, Chapter VII; and Pintner, *Educational Psychology*, Chapters IV and V.

<sup>2</sup> From Francis Galton, *Hereditary Genius*. London: Macmillan & Co., Ltd., 1869, pp. 14-16.

I am indebted to a Cambridge examiner for a copy of his marks in respect to two examinations, in which the scales of marks were so alike as to make it easy, by a slight proportional adjustment, to compare the two together. . . . The lowest man in the list of honours gains less than 300 marks; the lowest wrangler gains about 1,500 marks; and the senior wrangler, in one of the lists now before me, gained more than 7,500 marks. Consequently the lowest wrangler has more than five times the merit of the lowest junior optime, and less than one-fifth the merit of the senior wrangler.

The precise number of marks obtained by the senior wrangler in the more remarkable of these two years was 7,634; by the second wrangler in the same year, 4,123; and by the lowest man in the list of honours, only 237. Consequently, the senior wrangler obtained nearly twice as many marks as the second wrangler, and more than thirty-two times as many as the lowest (honours) man. I have received from another examiner the marks of a year in which the senior wrangler was conspicuously eminent. He obtained 9,422 marks, whilst the second in the same year—whose merits were by no means inferior to those of second wranglers in general—obtained only 5,642. The man at the bottom of the same honour list had only 309 marks, or one-thirtieth the number of the senior wrangler. . . . The mathematical powers of the last man on the list of honours, which are so low when compared with those of a senior wrangler, are mediocre, or even above mediocrity, when compared with the gifts of Englishmen generally. Though the examination places 100 honour men above him, it puts no less than 300 "poll men" below him.

## 2. A CONCRETE ILLUSTRATION OF THE PROBLEMS OF INDIVIDUAL DIFFERENCES<sup>3</sup>

*E. L. Thorndike*

The best means of introduction to the study of individual differences, their causes and their educational significance, will be to examine an actual first-hand study of them. For this purpose I choose certain parts of Mr. S. A. Curtis' report on the arithmetical abilities of children in the schools of New York City [11-12].

Mr. Curtis measured the achievements of pupils in responding to eight tests. Test 7 is reproduced on page 385.

Consider now the results of Test 7 in a certain eighth-grade class as shown in Fig. 16. Consider also Table XVIII, which gives similar facts for all the eighth-grade children tested. The figure and this table state an important fact—the existence of great individual differences even among those of the same school grade, and so of roughly similar training in arithmetic.

<sup>3</sup> From E. L. Thorndike, *Educational Psychology*, Vol. III. New York: Bureau of Publications, Teachers College, Columbia University, 1921, pp. 144-146.

# INDIVIDUAL DIFFERENCES

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## ARITHMETIC—TEST No. 7. FUNDAMENTALS

Name \_\_\_\_\_

School \_\_\_\_\_

Grade \_\_\_\_\_

In the blank space below, work as many of these examples as possible in the time allowed. Work them in order as numbered, writing each answer in the "answer" column before commencing a new example. Do no work on any other paper.

Number	Operation	Example	Answer	Right
1	Addition	a $25 + 830 + 122 =$ (Write answer in this column)  b $232 + 8021 + 703 + 3030 =$		
2	Subtraction	a $5496 - 163 =$ b $943276 - 812102 =$		
3	Multiplication	$2012 \times 213 =$		
4	Division	$158664 \div 132 =$		
5	Addition	$6134 + 213 + 4800 + 6005 + 3050 + 474 =$		
6	Subtraction	$73210142 - 49676378 =$		
7 } 8 }	Multiplication	$46508 \times 456 =$		
9	Division	$27217182 \div 6 =$		
10 } 11 }	Division	$3127102 \div 463 =$		
12 } 13 }	Addition	$85586 + 69685 + 39397 + 95836 + 37768 + 69666 + 78888 + 54987 =$		
14	Subtraction	$15655431 - 5878675 =$		
15 } 16 }	Multiplication	$78965 \times 678 =$		
17	Division	$44502486 \div 7 =$		
18 } 19 }	Division	$5373003 \div 769 =$		

Number of  
Children Making  
Each Score

17	x	1
16	x	1
15		0
14	x	1
13	x x x	3
12	x x x	3
11	x x x x	4
10	x x x x x x x x	8
9	x x x x	4
8	x x x x	4
7	x x x x x x	6
6	x x x x	4
5	x x x x x x x	6
4	x x	2
3		0
2	x	1

FIG. 16.—The Variation in Ability Within a Single Class After Courtis (Adapted).

TABLE XVIII

THE VARIATION AMONG EIGHTH-GRADE PUPILS IN ARITHMETICAL COMPUTATION  
(After Courtis, '11-'12, p. 46.)

"Score" or "Quantity": Examples Done Correctly in 12 Minutes in the Case of Test 7	Number of Children Making Each Score or "Frequency". 8th Grade Children in New York City
19	31
18	25
17	86
16	107
15	182
14	251
13	327
12	390
11	453
10	497
9	475
8	425
7	333
6	312
5	239
4	152
3	88
2	71
1	30
0	28

### 3. THE EXTENT OF DIFFERENCES WITHIN A FIFTH-GRADE CLASS<sup>4</sup>

*S. L. Pressey*

To illustrate the extent of differences within a single group of children, the results of a concentrated study of 34 fifth-grade children are reported. This group was given medical examinations, tests, and questionnaires of various sorts by means of which the differences were studied. These children varied in height from 47 to 60 inches and in weight from 55 to 103 pounds. Only two children showed no defects; 7 of them were farsighted, nearsighted, or astigmatic; 14 needed to have their tonsils removed; 31 had at least one decayed tooth; 4 had impacted teeth; 3 had adenoids; 1 was a cripple; 8 were seriously malnourished; one was slightly deaf. In social adaptation the group included 3 distinct leaders, one child who took no part whatever in the social life of the class, one bully, one truant, 2 delinquents, one chronic liar, and 4 extremely boastful children. Of the 34, only 9 were without at least one admitted specific fear, obsession, or other unusual emotional attitude; 2 children were so queer as to be classed as "eccentric." The I.Q.'s of the class varied from 68 to 147; 3 children were classifiable as brilliant, 5 as bright, 16 as average, 8 as dull, and 2 as defective. Two children had marked musical ability,

<sup>4</sup>From S. L. Pressey, *Psychology and the New Education*. New York: Harper & Brothers, 1933, pp. 250-251.

one drew unusually well, 4 had superior mechanical skill. In educational tests they varied as follows: in arithmetic skills, from the second- to the seventh-grade level; in arithmetic reasoning, from second to eighth grade; in speed of handwriting, from third to sixth grade; in quality of handwriting, from second to eighth; in spelling, from third to seventh; in reading rate, from second to ninth; in reading comprehension, from fourth to eighth grade.

The differences above illustrated are not extraordinary or unique in any way. They are differences that will be found to exist in any typical, unselected group of school children.

#### 4. CURVES OF DISTRIBUTION <sup>5</sup>

*John G. Jenkins*

Suppose we stand at a busy street corner and ask the first 10,000 people who pass to submit to certain tests and measurements. Such a procedure would ordinarily give us a *large* and *random sampling* of the inhabitants of that region. If we begin by making simple physical measurements of height, the

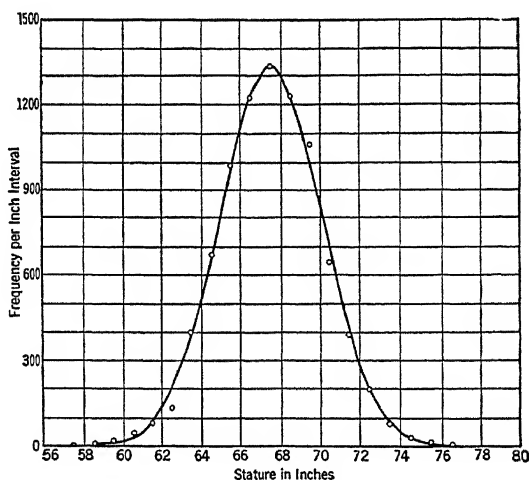


FIG. 17.—Showing the curve of distribution obtained by measuring the height of 8500 adult British males.

popular conception would lead us to expect that we might sort the people measured into three general groups (tall, average, and short).

An excellent idea of what actually happens if we take a large and random sampling\* of adult males and arrange them according to height may be

<sup>5</sup> Reprinted by permission from *Psychology in Business and Industry*, by J. G. Jenkins, published by John Wiley & Sons, Inc., 1935, pp. 214-215, 217-218.

\* G. U. Yule, *An Introduction to the Theory of Statistics*, Charles Griggin and Company, 1911, 302. The curve is based on measurements on 8500 adult males.



gained from Fig. 17. Instead of a neat array of separate types ("tall," "average," "short"), we find that the distribution closely resembles the form of what statisticians call the *curve of chance*, or the *normal curve of distribution*. . . .

. . . Inspection of typical curves of distribution will serve to show the reader that the following conclusions, contrary to popular belief though they may be, are inescapable.

(1) Most individuals cluster near the average, with fewer and fewer representatives of each point as we move farther and farther from the central region.

(2) Instead of clear-cut types which differ qualitatively from each other, there is a gradual *quantitative* (not qualitative) *change* as we move from one extreme of a measurable trait to the opposite extreme of the same trait.

(3) Any line of demarcation written into the curve is purely arbitrary; it will involve difficulty in classifying a large number of borderline cases.

(4) Any name applied to any part of the curve is not the name of a sharply defined type, but simply a convenient designation applied to those who fall in some one general region of the area included in the curve.

## 5. SAMPLE DISTRIBUTION CURVES

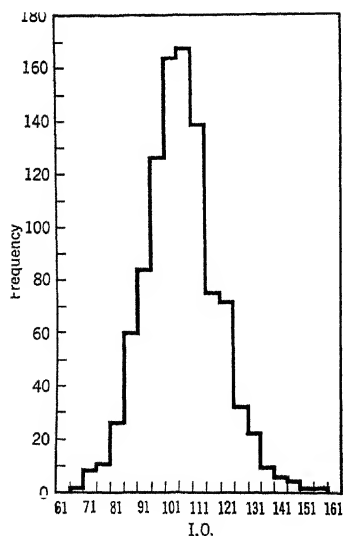


FIG. 18.—Distribution of Intelligence Quotients of 1001 First-Grade Children. (M. M. Wentworth, *Individual Differences in the Intelligence of School Children*. Cambridge: Harvard University Press, 1926.)

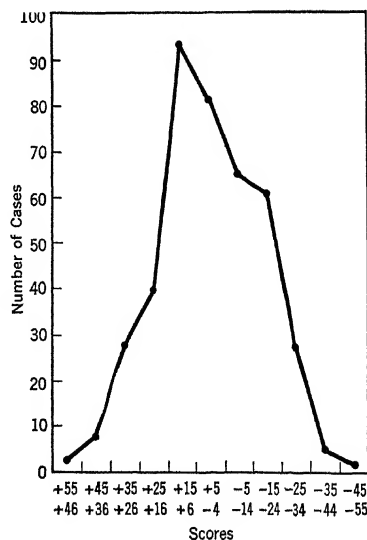


FIG. 19.—Distribution of Ascendance-Submission Scores of Four Hundred College Men. (G. W. Allport, "A Test for Ascendance-Submission." *Journal of Abnormal and Social Psychology*, 23, No. 2, 1928.)

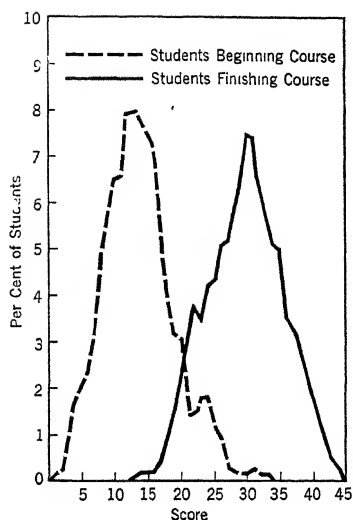


FIG. 20.—Distribution of Scores Made by a Group of College Students on a Psychology Test at the Beginning and at the End of a Year Course in Elementary Psychology. (C. E. and R. H. Seashore, *Elementary Experiments in Psychology*, New York: Henry Holt and Company, 1935.)

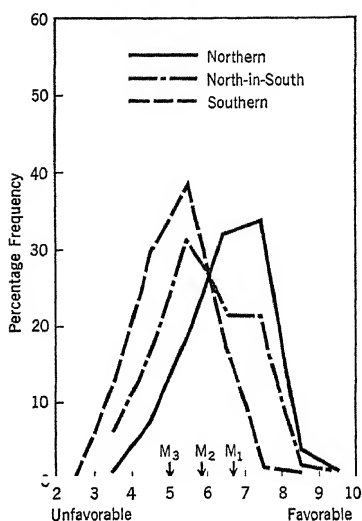


FIG. 21.—Distribution of Attitude toward the Negro Scores for Three Groups of College Students. (V. M. Sims and J. R. Patrick, "Attitude toward the Negro of Northern and Southern College Students," *Journal of Social Psychology*, 7, 1936, p. 194.)

## 6. THE NATURE OF THE DISTRIBUTION OF HUMAN TRAITS<sup>6</sup>

Frank S. Freeman

Human beings in their range and complexity of variability can no more be classified properly as introverts and extroverts, pyknics and asthenics, perseverators and nonperseverators, than they may be classified as geniuses or idiots, giants or dwarfs. This is not to say, however, that there are not some individuals who may be classed at one or the other of the extremes of these and other traits. But when persons in general are considered, it is found that instead of distinct, opposed types there is a continuous gradation from one extreme to the other, showing a concentration of individuals about a central point, with the frequency of occurrence decreasing as the distance from the central tendency increases. Wherever large unselected groups have been studied objectively with respect to intellectual capacity, educational accomplishment, physical characteristics, aspects of personality, and the like, the "pure type" and the "mixed type" are found to be relatively infrequent; but there is, instead, a single type, namely the average or mediocrity, around which and from which individuals may deviate as variants.

<sup>6</sup> From F. S. Freeman, *Individual Differences*. New York: Henry Holt and Company, 1934, pp. 35-36.

7. FACTORS UNDERLYING INDIVIDUAL DIFFERENCES <sup>7</sup>*White House Conference*

There are two main factors underlying the variability: the genetical or hereditary factor and the environmental factor. Useful as this separation of internal and external factors in development may be for academic purposes, it is impossible to separate them in practice. The internal factors cannot operate at all excepting in the presence of suitable conditions of life, and the conditions of life are entirely ineffective in modifying development excepting as they have the developing organism to act upon. The end result in the development of the child is due to interaction of internal and external factors. Only in specific instances can we inquire as to their relative importance. No one can for a moment deny that differences in the bringing up of a child may have an influence upon his development. Equally futile is it to explain the effect of environment without understanding the constitutional or genetical peculiarities of the developing child.

## III. Educational Provisions for Individual Differences

1. CLASSIFICATION OF PROVISIONS FOR INDIVIDUAL DIFFERENCES <sup>8</sup>*Roy O. Billett*

Provisions for individual differences . . . may be reduced to seven categories, namely, (1) homogeneous grouping, (2) special classes, (3) plans characterized by the unit assignment, (4) scientific study of problem cases, (5) variation in pupil load, (6) out-of-school projects and studies, and (7) advisory or guidance programs. Of the seven, the first three—homogeneous grouping, special classes, and the unit assignment—have been found to be core elements in a typically successful program to provide for individual differences. These three form a kind of trinity, a sort of three-in-one answer of the nation's outstanding schools to the problem of providing for individual differences. There is no evidence that intrinsically these three plans are alternative rather than complementary procedures. Each has its own peculiar function to perform.

2. ABILITY GROUPING IN THE DETROIT SCHOOLS <sup>9</sup>*S. A. Courtis*

With the development of group tests and the growing emphasis upon individual differences, a demand arose for experimental trial of the plan of

<sup>7</sup> From White House Conference on Child Health and Protection, *Growth and Development of the Child*, Part I, "General Considerations." New York: D. Appleton-Century Company, 1932, pp. 13-14.

<sup>8</sup> From Roy O. Billett, "Provisions for Individual Differences, Marking and Promotion," National Survey of Secondary Education, Bulletin, 1932, No. 17. Superintendent of Documents, Washington, p. 11.

<sup>9</sup> From S. A. Courtis, *Ability Grouping in Detroit Schools*. The Twenty-fourth Yearbook of the National Society for the Study of Education, 1925, Part II, pp. 44-46. Quoted by permission of the Society.

sectioning on the basis of ability. After suitable preliminary experimentation, the Department met this demand in September, 1920, by giving the Detroit First-Grade Group Intelligence Test to all children entering the lowest (B1st) grade, about 10,000 in all.\* On the basis of the scores obtained these children were divided in "X, Y, Z" groups. The average or normal children, comprising the middle 60 per cent of the children in any grade, constitute the "Y" group. The superior 20 per cent and the inferior 20 per cent of the children constitute the "X" and the "Z" groups, respectively.

In schools where the numbers of children in the different groups warranted it, classes were organized wholly of X, Y, or Z children; in smaller schools class organizations often contain two groups, as X and Y, or Y and Z, depending on the intelligence level of the neighborhood. In the smallest schools the most that could be done was to section into three groups within the class organization for recitation purposes.

From the outset it was realized that no classification by tests could be absolute. Teachers and principals were privileged to change children from one division to another in accordance with their actual success in school work during the first two years. The position of any child in a group, after the very first grouping, is thus determined both by the results of the mental tests and by the teacher's judgment. Actually, it has been found necessary to change the placement of less than 40 per cent of the children.

The X-Y-Z plan contemplates a differentiated course of study; the regular course for the Y's, an enriched course for the X's, and a simplified course of minimal essentials for the Z's covering exactly the same ground. Experience has shown that mere change in amount of ground covered is not enough, that the rates of development of the pupils in the different groups vary. For instance, the B4th Z's reach a stage of development in the fourth year of work in reading which is attained by the A2nd X's. Further, there appears to be need for differentiation of teaching methods as well as for differentiated courses of study.

The practice begun in 1920 has been continued ever since. Today the X-Y-Z classification is in effect through the B5th grade and involves some 80,000 children. Intelligence testing and sectioning on the basis of ability has spread to the intermediate, high schools, and colleges, until today the intelligence factor is given consideration in sectioning throughout the system.

### 3. THE WINNETKA PLAN OF INDIVIDUALIZED INSTRUCTION<sup>10</sup>

*Carleton W. Washburne*

The curriculum is divided into two parts. One part deals with knowledges and skills of which everyone alike needs mastery. The other part provides

\* An account of this work was given by W. K. Layton in the *Twenty-first Yearbook*, Part II.—Editor.

<sup>10</sup> From Carleton W. Washburne, *Twenty-Fourth Yearbook of the National Society for the Study of Education*, Part II, pp. 79-82. Quoted by permission of the Society.

for each child self-expression and the opportunity to contribute to the group something of his own special interests and abilities.

Under the first head come the common essentials—the “three R’s” and similar subject matter. Every child needs to know certain elements of arithmetic, needs to be able to read with a certain speed and comprehension, needs to spell certain common words, needs to know something about those persons, places, and events to which reference is constantly made. Since every child needs these things, and since every child differs from others in his ability to grasp them, the time and amount of practice to fit each child’s needs must be varied. Under the old regime, in the effort to give different children the same subject matter in the same length of time, the quality of the children’s work, the degree of their mastery, varied from poor to excellent, as attested by their report cards. But under the Winnetka technique of individual education, instead of quality varying, time varies: a child may take as much time as he needs to master a unit of work, but master it he must. The common essentials, by definition, are those knowledges and skills needed by everyone; to allow many children, therefore, to pass through school with hazy and inadequate grasp of them, as one must under the class lock-step scheme, is to fail in one of the functions of the school.

The part of the curriculum which should provide self-expression and group activities is quite another matter. Here there is no common skill or knowledge to be mastered. Here each child may legitimately differ from his neighbor in what he gets from school. It is the school’s job to provide opportunities for his special interests and abilities to develop. In this field, education recognizes the importance to evolution of the law of variation and therefore takes full advantage of children’s differences. The children must learn how to make up for their weaknesses by using the strength of others and how to contribute their special abilities to the undertakings of the group.

To provide for both of these main divisions of the curriculum, half the morning and half the afternoon are given over to individual work in the common essentials, while the other half of each session is given to group and creative activities.

During the time devoted to individual work in the common essentials every child does his own job. If one steps into a “fourth-grade room” for example, he may find each child doing a different thing. One is just finishing third-grade arithmetic, another has begun compound multiplication, another is in the middle of long division, while still another may be beginning fifth-grade work in fractions. A child may be doing fourth-grade arithmetic during one period, but a few minutes later, in the same room, be doing fifth-grade reading.

There are no recitations. Each child prepares a unit of work, checks his results with an answer sheet, and goes on to the next unit. When he has done a small group of units—an amount of work which may have taken him three days or two weeks—he tests himself on this group: if he finds that he has mastered it, that his practice test is 100 per cent right, he asks the teacher for

a real test. This test the teacher corrects. If it is not 100 per cent, the child practices again on the weak points shown by it, then asks for a retest. When he shows the teacher that the group of units (called a "goal" in Winnetka) is mastered, he works on toward the next goal.

The teacher, under this plan, spends her whole time teaching, not listening to recitations. She helps an individual here or a group there; she encourages and supervises. She is about among the children as they work, not at her desk.

No child ever "fails." Nor does one ever "skip a grade." If in June a child has not finished his grade's work, in September he goes on from where he left off. If a child can do more than a grade's work a year, he does so—but he does *all* the work, without skipping any. The child is on a piece-work basis, not a time-work basis. He gets the habit of mastering each thing he undertakes.

During the half of the morning and half of the afternoon devoted to group and creative activities, the children are not working toward any set goals, nor are they tested. Going into one of the rooms during this part of the day, one may find the children dramatizing a part of their history work. Perhaps they are putting on a very informal impromptu dramatization, or perhaps they are preparing a more elaborate one which may be presented to the school as a whole during assembly.

The assembly is a sort of open forum. One day it may be a program planned by the children and entirely conducted by them. Another day it may be a business meeting in which all the local school affairs are discussed and worked out by the children themselves. It is interesting to see a third-grade child presiding over an assembly of two or three hundred of her schoolmates, in good parliamentary form, and entertaining motions regarding such things as whether children should ride their bicycles on the playground or whether snowballing on the playground should be permitted.

Every child in the Winnetka schools has an opportunity to serve on some committee. These committees manage all the student activities. They are usually made up of representatives from each classroom. They are sufficiently numerous to provide a place for every child. In one school for instance, there is a committee on assembly programs, a committee on care of school grounds, a committee on the care of plants in classrooms, a committee on the toilets, a committee on playground rules, and so on through the gamut of school affairs.

It is during the group and creative-activities part of the day that the Winnetka children have their field trips; that one room may entertain another; that creative work is done in art and in shop work, each child making the thing which he himself wishes to make. It is during this part of the day that the children issue their school newspaper, articles to which are contributed by children from the first grade up. The editing, typesetting, proof reading, and business management of the newspaper are in the hands of the seventh-

and eighth-grade junior high school children, who carry a real commercial account in one of the Winnetka banks, and pay all their bills with checks.

It is during this freer part of the day that children learn how to fit their interests and abilities in with those of others, to co-operate, to participate in the activities of the group. At such time they learn to merge their personal interests in the welfare of the whole, and they learn to contribute their special abilities to this group welfare.

By providing flexibility of time for the mastery of common essentials and by providing opportunity for children to exercise and use their different interests and abilities, the Winnetka schools are adapting the curriculum to the individual differences that exist among children.

#### 4. SPECIAL CLASSES IN INDIVIDUAL SCHOOLS<sup>11</sup>

Roy O. Billett

*Classes for the very capable or gifted.*— . . The D. A. Harmon Junior High School of Hazleton, Pa., is one of several schools where efforts have been made to check the results of acceleration by a study of the subsequent scholastic records of accelerated pupils. In this school a group of very capable pupils completes the work of both grades 7 and 8 in one year. The scholastic record of the accelerated group which entered grade 9 in September, 1924, shows that of all marks earned in academic subjects during the last four years of high school, 49 per cent were A's or B's, 43 per cent were C's, 12 per cent were D's, and but 1 per cent were E's. This record suggests that acceleration did not interfere with the pupil's ability to do the work of the ensuing years.

In Gary, Ind., an extensive system of Saturday classes is scheduled from 8:15 to 11:15 a.m. offering work in all subject matter fields. The classes are open to all children and attendance is purely voluntary. Capable children in large numbers attend these classes to pursue of their own accord supplementary projects in the fields of greatest intrinsic interest to them. For such children the Saturday classes are in every sense enrichment classes. . . .

*Special instruction in the fundamental of English and arithmetic.*—Many schools are segregating pupils for special help in the fundamentals of English and arithmetic with a view to improving the pupils' work in all academic subjects. Among these may be mentioned the Langley Junior High School of Washington, D. C., where such remedial classes are provided for both seventh- and eighth-grade pupils; East High School of Superior, Wis., where seventh-grade pupils below the grade norm in reading as shown by standardized tests are segregated for supplementary drill; and the Central Junior High School of Los Angeles, where the work of a special class for pupils with intelligence quotients above 90 is concentrated upon remedying disabilities in reading and arithmetic. Harding Junior High School of Lakewood, Ohio, maintains two special classes in mathematics and three special classes in reading, each meeting twice a week during the activities' period. Pupils of grades

<sup>11</sup> From Roy O. Billett, *op. cit.*, pp. 214-220.

7, 8, and 9 are served by these classes. Pupils are assigned to the classes on the basis of scores made on standardized tests.

In Gillespie Junior High School, Philadelphia, special classes are maintained for remedial work in reading. The work done in these classes has restored to normal classification about half of the pupils who have been assigned to them because of failing marks in one or another of the academic subjects. . . .

*Special curriculums for slow-learning groups.*— . . The Cass Technical High School of Detroit has established an occupational curriculum for slow groups extending through grades 10, 11, and 12. In Lancaster, N. Y., a group of low-ability pupils is segregated throughout the last four years of high school. With the parents' consent these pupils receive a "finishing course" which prepares them for immediate entrance into a vocation rather than into higher institutions of learning. Springfield, Mass., provides special curriculums in central schools for boys and girls of low ability whose chronological ages range from 14 to 16 years. Occupational activities are emphasized and academic work is closely associated with handwork. Before assigning a pupil to these classes the following steps are taken: (1) The pupil is reported to the visiting teacher by the teacher and the principal; (2) the visiting teacher calls at the home and secures the parents' permission to give the child a psychological examination; (3) the clinical psychologist administers psychological tests, diagnoses the case, and makes recommendations; and (4) the research department administers tests of school achievement. Children assigned to the special classes are given educational tests from time to time to determine progress being made and to furnish a basis for recommendations as to changes in placement. . . .

*Special classes for habitual-behavior problems.*—Many schools of considerable size find it advisable to segregate into classes for special instruction those pupils who constitute serious behavior problems. Almost always these classes are further segregated on the basis of sex. A large proportion of the pupils have court records and are in danger of becoming confirmed in vice or crime. Such classes are usually placed in the hands of capable teachers known to exert a strong moral influence over adolescents. . . .

*Special-help periods for coaching and individual instruction.*—In the Seward Park High School, New York, a purely voluntary system is reported whereby pupils in need of extra help are coached before school hours, after school hours, and whenever opportunity is found. The responsibility is placed upon the teachers. However, in many schools definite periods are set aside for the coaching and individual instruction which many pupils need if failure is to be avoided. For instance, the East Hartford High School, East Hartford, Conn., sets aside a half hour at the end of the school day, from 2:45 to 3:15, for such work. Thirty-one teachers of a faculty of thirty-nine meet pupils regularly at this time. . . .

*Special classes for pupils who have failed or are in danger of failure.*—In the Montclair Senior High School, Montclair, N. J., a special class is or-



ganized at the end of the first twelve weeks for pupils in danger of failing in tenth-grade Latin. The parent is notified of the pupil's transfer to the class. He is informed that the pupil's chances of success during the present year are greatly increased but that the pupil will find it necessary to discontinue Latin at the end of the current year.

The English department of the James Monroe High School, New York, forms special classes at the end of the first semester for pupils who have failed.

#### 5. CRITICAL EVALUATION OF CURRENT ADJUSTMENTS TO INDIVIDUAL DIFFERENCES IN AMERICAN SECONDARY SCHOOLS<sup>12</sup>

Roy O. Billett

*Homogeneous grouping.*—So-called homogeneous grouping is a refinement of classification resulting in reduced heterogeneity. Homogeneous grouping is of most certain value to pupils of less than normal abilities; that is, it is an adaptation of the educative environment made for the pupil, hence pupils least able to make adaptations for themselves are most likely to profit by it. Homogeneous grouping is peculiarly a procedure for the junior high school since many pupils of less than normal ability usually have been eliminated before reaching the grades of the typical senior high school. If differentiation of instruction and subject matter, programs of exploration and guidance, and other features of a program to provide for individual differences in the junior high school should result in many pupils of less than normal ability being sent on into the senior high school, then homogeneous grouping would seem almost as imperative in the senior high school as in the junior high school. . . .

Much controlled experimentation is needed to determine the relative merits of the many bases and combination of bases of grouping now in use. Many factors should be considered in assigning a pupil to a given homogeneous group. In academic subjects probably the principal numerical criterion should be the higher of two or more intelligence quotients, derived from two or more forms of a group mental test, supplemented by scores from reliable and valid prognostic tests in subjects where such tests are available. In nonacademic subjects probably the principal numerical criterion should be scores from tests prognostic of the pupil's ability to do work in the given field. All numerical criteria should be interpreted in the light of other available data concerning the pupil. Grouping on the basis of relatively unchangeable traits significant of the pupil's probable learning rate is preferable to grouping on the basis of relatively changeable traits, since groups formed on the basis of relatively changeable traits at once tend to become heterogeneous.

Differentiation of teaching procedure for groups of varying abilities has proved much more feasible under practical public school conditions than differentiation of subject matter. Back of the problem of differentiation of subject matter lies a virgin field of research into the nature of valid units of

<sup>12</sup> From Roy O. Billett, *op. cit.*, pp. 418-422.

subject matter and their optimum sequence. Homogeneous grouping is applicable in schools of any size if grouping *within* the class section is practiced. Under this plan the class period is divided into alternating periods of directed study and class discussion for each of the several groups. . . .

*Special classes.*—Special classes begin where homogeneous grouping leaves off; that is, they are formed for those pupils who deviate most extremely from the norm in capacities, in needs, or in both. Special classes are provided about nine times as often for slow-learning pupils as for the very capable or gifted. The evidence suggests that “honors courses” may be a very acceptable alternative to segregated enrichment classes for the very capable or gifted. Special classes primarily for the very slow have been created because, when all other provisions for individual differences are functioning efficiently, a certain small percentage of the pupils do not succeed with the regular school work unless given additional help or motivation. Pupils highly heterogeneous in abilities, interests, needs, and aims find their way into classes for the slow-learning.

The most frequently considered bases for assigning pupils to classes for the slow-learning are teacher’s rating of the pupil’s academic ability or intelligence and the pupil’s average scholarship marks in certain subjects. Six types of data are stressed in assigning pupils to special classes for the very capable or gifted, namely, industry, health, average scholarship marks in all subjects combined, intelligence quotient from a group test, physical maturity, and social maturity. Formulas are avoided in determining whether a pupil shall be assigned to a special class. Each case is handled individually in the light of the available data.

The facts suggest that special classes, like homogeneous grouping, are needed oftener in the lower grades than in the upper grades of the secondary school. Pupils are usually assigned to, or removed from, special classes for the slow-learning as occasion demands. Classes for pupils decidedly subnormal in native ability or for pupils who are very capable or gifted are created with the expectation that most pupils assigned to them will remain there permanently. Classes for slow-learning pupils are scheduled during the regular school day, before or after the regular school day, or on Saturdays. A scheduled period at the end of the school day is by far the most common procedure. During this period each regular classroom teacher coaches his or her own deficient pupils. Classes for the very capable or gifted, for serious behavior problems, and for slow pupils whose handicaps are regarded as native and permanent, are scheduled within the limits of the regular school day. . . .

*Plans characterized by the unit assignment.*—In practice a number of widely discussed plans, techniques, or procedures characterized by the unit assignment are essentially one and the same thing. The procedures are known variously as the project method, problem method, differentiated assignments, long-unit assignments, contract plan, laboratory plan, individualized instruction, Winnetka technique or some modification, Dalton plan or some modification, and Morrison plan or some modification. . . .

A clear-cut distinction should be made between the unit and the unit

assignment. The unit is regarded . . . as a concept, attitude, appreciation, knowledge, or skill to be acquired by the pupil, which if acquired, will produce a desirable modification of his thinking or other forms of his behavior. The unit assignment consists of those activities and experiences planned by the teacher to enable the pupil to master the unit. On the whole the practices of schools reporting the use of the Morrison plan, the Dalton plan, or the Winnetka technique are much alike, being attempts to develop classroom procedures adapted to the use of some form of the unit assignment. The unit assignment is certain to become a fundamental feature of any successful program to provide for individual differences. It possesses the extremely valuable attribute of being equally adaptable to schools and classes of all sizes and of all types.

*Scientific study of problem cases.*—The individual pupil must be a known quantity if successful provisions are to be made for his particular needs. This fact is emphasized by efforts at the scientific study of pupils who have become problem cases. Moreover, the collection of accurate and comprehensive data concerning every pupil and the filing of these data for frequent and ready use are fundamental to all other features of a program to provide for individual differences. In outstanding schools each pupil's interests, special aptitudes, aims, heredity, home environment, health history, school history, and many other significant characteristics and accomplishments, both physical and mental, are known and made a matter of record. In such schools serious problem cases occur infrequently but when they do occur the data are ready at hand for a preliminary case study. In these schools, furthermore, the services of a visiting teacher, counselor, or consulting psychologist are available if a complete case study involving the collection and interpretation of further data is necessary. The scientific study of problem cases is a provision for individual differences feasible in schools of all sizes and types. For financial reasons, however, a school may lack the necessary trained personnel to make possible the collection of sufficient reliable data, its proper filing, or its interpretation. Moreover, the needed facilities for the application of remedial treatment may not be at hand.

*Variation in pupil load.*—By variation in pupil load is meant variation in the number of subjects a pupil is permitted to carry for credit. . . . Only a few schools are varying systematically the number of subjects which pupils may carry for credit as a provision for individual differences. The plan has met with evident success. Full realization of its possibilities depends upon the sanction of accrediting agencies.

*Out-of-school projects or studies.*—In schools awarding credit for out-of-school projects or studies only a fraction of 1 per cent of the pupils comprising the total enrollment are carrying such work. Although no extensive or unusual work is being done along this line the field seems to be a promising one. Out-of-school projects or studies are less prevalent in schools including only the lower secondary grades than in schools including the higher secondary grades.

## REFERENCES

The student interested in a brief general treatment of the problem of individual differences is referred to any standard textbook on educational psychology. Materials on special aspects of the problem are to be found primarily in the scientific journals, references to which may be located in the *Psychological Index* and the *Education Index*. The following general references will be found useful for more extended treatments, their nature being suggested by the titles.

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- Thorndike, E. L., *Educational Psychology*. Vol. III, *Individual Differences and Their Causes*. New York: Bureau of Publications, Teachers College, Columbia University, 1914, p. 408.
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## EXERCISES

1. In the light of the facts presented in the first three readings evaluate the dictum that "All men are created free and equal." In what sense does the absence of equality imply absence of freedom? Should the school assume equality?
2. Examine the sample curves of distribution for each of Jenkin's conclusions concerning typical curves. Is there an "impassable gulf" between normalcy and genius? Are most persons introverted or extroverted? Does the word "moron" indicate a type of feeble-mindedness? Explain.
3. Does the concept of quantitative, rather than qualitative, differences in the distribution of human traits apply to the grades given in a course? In a typical class where a five-letter grading system (A,B,C,D,E) was used, what grade would you expect most students to make, what grades the least? Roughly graph the distribution that you would expect, and if possible compare it with actual distributions. What is the fundamental difference between an A and a B student? Must the line of demarcation between "passing" and "failing" students be arbitrary?
4. Would you say that most persons were either honest or dishonest? Explain. What sort of curve would a distribution of the I.Q.'s of college seniors make? Why? Suppose you should distribute on the same base line the attitude toward Catholicism of 100 Catholics and 100 Baptists, what sort of curve would you expect to find? How would you expect to find honesty, I.Q.'s, and attitude toward Catholicism distributed in the general population? Explain.
5. Why would one say that the problem of "heredity versus environment"

was largely an academic issue? Contrast the position of the eugenicist and the eutheicist on this issue. From a practical standpoint should the teacher emphasize environmental or hereditary factors? Why?

6. What does Billett mean when he says that homogeneous grouping, special classes, and plans characterized by the unit assignment are complementary? Would the members of a homogeneous group be truly homogeneous? Would the highest pupil in a "Y" group be more comparable to the lowest in "Y" than the lowest in the "X" group? Could you so group them that it would be otherwise? Explain.

7. Someone has said that the philosophy back of homogeneous grouping was one of educational determinism. In what sense is this true? Are plans for providing for individual differences compatible with the democratic ideal of equality of opportunity?

8. At what level in the school system is the problem of individual differences most acute? Why? Would you say there was greater need for providing for individual differences in the secondary schools of today than there was 50 years ago? Explain.

9. To what extent have the instructors whom you have had at the college level recognized individual differences? In what sense does the college curriculum recognize individual differences? How does the attempt to "maintain standards" complicate the problem of providing for individual differences?

10. Which of the following school practices are based upon an adequate recognition of individual differences?

- a. Requiring all high school students to take Latin.
- b. Using special coaching to enable certain pupils to skip a grade.
- c. State-wide adoptions of text books.
- d. Differentiated assignments to pupils in the same class section.
- e. Requiring all pupils to participate in at least two extra-curricular activities but limiting them to three activities each.
- f. Standardizing the contents of the high school algebra course for all schools in a city.
- g. Offering exploratory courses for pupil guidance.
- h. Organizing a "summer session" for pupils who have failed.

## CHAPTER XVIII<sup>1</sup>

### INTELLIGENCE AND ITS MEASUREMENT

M. J. Van Wagenen, *University of Minnesota*

#### I. Introduction

Intelligence has been one of the most discussed topics in the field of educational psychology within the past twenty years. Many tests have been invented for the purpose of studying individual differences in capacity to learn and to adjust to relatively new and changing conditions. Hundreds of thousands of copies of these tests have been used in our schools for numerous purposes. Teachers are asking if testing programs are worth while. Others are asking if classroom teachers should know the mental rating of the pupils or if that knowledge should be left to the school psychologist and principal. They are asking if pupils should know the ratings assigned them, if it is advisable to segregate the dull and the gifted, if sectioning of classes into X, Y, and Z groups is to be recommended, and if intelligence test results afford a sound basis on which to predict a child's future. Psychologists are pretty well agreed that intelligence tests administered and interpreted by experts, are most valuable, whereas in the hands of the amateur tester, they are likely to do more harm than good. They are also agreed that intelligence is but one aspect of personality and that what an individual is and what he will develop into involves the entire person and not alone the degree of brightness which he possesses. In other words, intelligence refers to one dimension of personality. Complete understanding of the individual would involve all possible dimensions.

#### II. The Nature of Intelligence

##### 1. THE NATURE OF INTELLIGENCE: A DESCRIPTIVE DEFINITION<sup>2</sup>

L. M. Terman

Meumann has pointed out that the fault of Stern's definition of intelligence as "general adaptability to the new problems and conditions of life"

<sup>1</sup> The selections chosen for this chapter will help the student to understand better the nature of intelligence, the uses of intelligence tests, and the need of experts in the field of test-making, experts who know how to get the best results from tests and who are fully aware of their limitations. This chapter furnishes valuable supplementary reading to chapters found in most textbooks. Consult the following: Griffith, *An Introduction to Educational Psychology*, Chapter XV; Skinner and Collaborators, *Educational Psychology*, Chapter XVI; Trow, *Educational Psychology*, Chapter V; Jordan, *Educational Psychology*, Chapter XIII; Sandiford, *Educational Psychology*, Chapter VIII; Gast and Skinner, *Educational Psychology*, Chapter III; Stroud, *Educational Psychology*, Chapters X, XI, and XII; Monroe, *et al.*, *Educational Psychology*, Chapter VIII; Wheeler and Perkins, *Principles of Mental Development*, Chapters IX and X; Pressey, *Psychology and the New Education*, Chapter VII; Pintner, *Educational Psychology*, Chapters V and VI; Bolton, *Everyday Psychology for Teachers*, Chapter XIX; Gates, *Psychology for Students of Education*, Chapter XV; and Bagley, *et al.*, *Human Behavior*, Chapter XIV.

<sup>2</sup> From L. M. Terman, "Intelligence and its Measurement." *Journal of Educational Psychology*, 12, 1921, pp. 127-128.

lies in the fact that it furnishes no clue for judging the value of different kinds of adaptation. Meumann would reverse Stern's procedure by first finding out what is demanded of intelligence and then analyzing the mental functions which meet that demand. In my opinion this is the only method of approach which will bring us any nearer to a psychological solution of the intelligence problem.

If we accept this view it is evident that the important intellectual differences among men will not be found on the sensory, perceptual, or purely reproductive level. It is well known that a moron may be able to see, hear, taste or smell, react to a signal, balance a bicycle, steer an automobile, or cancel A's about as well as an intellectual genius. The latter would be somewhat his superior in memory for nonsense syllables, would excel him still more in logical memory, and would outclass him hopelessly in the ability to distill meanings from the raw products of sensation and memory. The essential difference, therefore, is in the capacity to form concepts to relate in diverse ways, and to grasp their significance. An individual is intelligent in proportion as he is able to carry on abstract thinking.

One may, of course, question our grounds for designating any kind of mental activity as "higher" or "lower" than another. Why, it may be asked, should certain types of mental processes be singled out for special worship? In fact, it is frequently intimated that the individual who flounders in abstractions but is able to handle tools skillfully, or play a good game of baseball, is not to be considered necessarily as less intelligent than the individual who can solve mathematical equations, acquire a huge vocabulary, or write poetry. The implication is that the two individuals differ merely in having different kinds of intelligence, neither of which is higher or better than the other.

It is difficult to argue with anyone whose sense of psychological values is disturbed to this extent. Such an individualistic view is not disposed of by calling attention to the obvious fact that civilization, with its science, art, government, religion, philosophy, and systems of credit, is unthinkable except as a product of concept elaboration and symbolic thinking; our opponent can retort that it is only our intellectual snobbery which leads us to regard the state of so-called civilization as "higher" than that of primitive man!

It cannot be disputed, however, that in the long run it is the races which excel in abstract thinking that eat while others starve, [that] survive epidemics, master new continents, conquer time and space, and substitute religion for magic, science for taboos, and justice for revenge. The races which excel in conceptual thinking could, if they wished, quickly exterminate or enslave all the races, notably their inferiors in this respect. Any given society is ruled, led, or at least molded by the five or ten per cent of its members whose behavior is governed by ideas. The typical pick-and-shovel man does his thinking chiefly on the sensorimotor and perceptual levels. Add a little more ability to think on the representative level and he may be able to repair your automobile, build you a house according to an architect's specifications, or nurse

you in illness. Add a large measure of ability to associate abstract ideas into complex systems and he can design a new type of engine, draft the plans for a skyscraper, or discover a curative serum.

## 2. THE TWO-FACTOR THEORY OF INTELLIGENCE<sup>3</sup>

*Charles S. Spearman*

The continued tendency to success of the same person throughout all variations of both form and subject matter—that is to say, throughout all conscious aspects of cognition whatever—appears only explicable by some factor lying deeper than the phenomena of consciousness. And thus there emerges the concept of a hypothetical *general* and purely *quantitative* factor underlying all cognitive performances of any kind. Such a factor as this can scarcely be given the title of “intelligence” at all; being evoked to explain the correlations that exist between even the most diverse sorts of cognitive performance, it does not deserve a name appropriate to any one particular sort. On this view, accordingly, the name is commonly written in inverted commas, or else replaced by the simple letter *g*.

Such a general and quantitative factor, it was said, might be conceived in an infinitude of different ways, including those which would assign to it the most subtle, abstract, or complex constitution. But a readily intelligible hypothesis was suggested to be derivable from physiology. The factor was taken, pending further information, to consist in something of the nature of an “energy” or “power” which serves in common the whole cortex (or possibly, even, the whole nervous system).

But if, thus, the totality of cognitive operations is served by some general factor in common, then each different operation must necessarily be further served by some *specific* factor peculiar to it. For this factor also, a physiological substrate has been suggested, namely, the particular group of neurons specially serving the particular kind of operation. These neural groups would thus function as alternative “engines” into which the common supply of “energy” could be alternatively distributed.

Cognitive events do, like those of physics, admit throughout of being reduced to a small number of definitely formulatable principles in the sense of ultimate laws. A doctrine has in this manner been evolved which, to distinguish it both from the still reigning facultism as also from the now moribund associationism, is here characterized as that of “noegenesis.”

*Apprehension of experience.*—To begin with, the source from which all cognition originally springs is beyond question *experience*. But in order to make this proposition fruitful, or even true, the word must not be taken in the broader, but in the narrower of the two meanings that ambiguously shimmer in it. It must mean that which is immediately “lived, undergone, enjoyed, and the like.” It thus consists, on the one hand in mental states or

<sup>3</sup> From Charles S. Spearman, *The Nature of Intelligence and the Principles of Cognition*, 1927, pp. 5-6, 341-343. By permission of The Macmillan Company.



"affections," and on the other in cognitive and conative acts. Among the states are to be reckoned in particular the initial effects of all kinds of sensory stimulation. As inhering in the experience must be counted, also, the experiencer; just as there can be no movement without something that moves, so too there can be no affection without some subject affected, nor act without someone acting.

Such experience, both its direct attributes and its subject—so our first principle enounces—admit of being cognized. A person cannot only feel, but also know that he feels; not only strive, but know that he strives; not only know, but know that he knows. This supervening of knowledge upon experience, however, would appear to be only a possible, not a necessary event. On many occasions, probably the great majority, it never happens at all. One special case of this—but by no means the sole one—is that of subconsciousness. The first cognitive principle runs, then, as follows: *Any lived experience tends to evoke immediately a knowing of its direct attributes and its experiencer.*

*Eduction of relations.*—With the preceding words, we explicitly accept the view held almost universally since the earliest days, that all knowing begins in actually occurring experience. The frequently expressed or implied addition, however, that genuine knowing extends no farther than such experience, has in the present work had to be repudiated. On the contrary, the existence has been shown of another and radically different kind of knowing, where the immediate basis may consist of nothing more than bare presentations; for between all characters, whether simultaneously experienced, or merely presented, at least *relations* can be known. The latter are, so to speak, drawn out or "educd" from the very nature or essence of the characters as presented. For example, the relation of difference can be educd as holding between "absence" and "impossibility," although neither of these can ever be characters of any actual experience. Accordingly, the second principle may have the following formulation: *The presenting of any two or more characters tends to evoke immediately a knowing of relation between them.*

Some detailed examination has been made of the general constitution and chief properties of the process which ensues from this principle. Especially remarkable is [it] that the relations so educd can themselves serve as fundaments whence further relations can be derived in similar manner, and so on without definite limit. And additional fundaments for the operation of this second principle are supplied in the products of a third one to be brought forward next. Very notable also is a consequence deriving immediately from the fact (mentioned on the preceding page) that all such fundaments may either be or not be directly apprehended in experience, else may be only presented mentally. For the ensuing processes fall into two corresponding groups; the former is especially concerned with "perceptual" operations, whilst the latter reigns in those commonly called "intellectual."

*The eduction of correlates.*—If the preceding principle has but seldom if ever met with clear and full recognition in psychology, immeasurably less adequate still has been the notice accorded to the facts which come to expres-

sion in the third. Formulated, this runs: *The presenting of any character together with a relation tends to evoke immediately a knowing of the correlative character.* For example, if the idea of "good" and that of "opposite to" are presented, there can out of these be obtained the correlative idea of "bad."

This third principle keeps closely parallel to the second. It is, like that, of an educative nature. Also, it is always applicable when, and only when, the second is so. Finally, the two ensuing respective processes always lead to exactly the same eventual result; they differ solely in respect of where the line comes between the items given initially and those arising in the process. But this last difference is of extreme importance; for in the case of the third process, the generated item is no longer a mere relation, but now itself a fundament. Moreover, this fundament can quite well be external to the experienter; by this means, and no other, a person is able to think of times, places, persons, and matter outside of himself.

### 3. AN ADEQUATE PRINCIPLE OF INTELLIGENCE <sup>4</sup>

*Frank N. Freeman*

Psychologically, degrees of intelligence seem to depend on the facility with which the subject matter of experience can be organized into new patterns. This rearrangement of thought material is what characterizes particularly the higher mental processes. It is not identified with any one of them, but it underlies them all. It fits admirably the behavioristic description of intelligence as the capacity for adaptation to novel situations.

Physiologically, this hypothesis means that intelligence depends upon the rearrangement of association patterns among the neurons—the formation of new paths of discharge. It is a familiar notion that superior brains, whether in the comparison of evolutionary stages or of individuals, are characterized by complexity of potential association-forming. This view fits very well the prevailing conception of the place of the synapses, or points of connection between neurons, in learning. It suits the fact that higher brains differ from lower brains chiefly in the size of the association areas—the areas which do not mediate particular sensations or movements but make possible an indefinitely complex series of associations between sensory and motor experiences. The hypothesis, then, meets well the demands of the description of intelligence and of the physiology and evolution of the brain.

The final test is the suitability of the hypothesis to the facts of correlation. Here again it seems to fit very well. The capacities which have low correlation with one another are the sensory and motor capacities. These are the capacities which depend to a large degree on the structure of particular areas of the brain and their related peripheral organs. These various areas and organs might well vary from each other in structure quite widely, so that a person who was equipped to make very fine discrimination among visual sensations might not be especially capable in auditory discrimination, and so on.

<sup>4</sup> From F. N. Freeman, *Mental Tests*. Boston: Houghton Mifflin Company, 1926, pp. 489-491.

But when we come to the mechanism by which new patterns are formed among the data of experience which are furnished by the various senses or by the individual's activities, the capacity of the brain may very well be a highly general one. The seat of this process, as we have seen, is probably the large association areas. We may conceive that these areas make possible and easy great complexity of organization or pattern forming, either because the neurons themselves are numerous or spatially well arranged, or because the structure of their synapses is such as to permit easy modification of the resistances to the nervous current and thus allow new connections to be made. It seems quite possible that brains may differ from each other very greatly in this general characteristic of facility in pattern formation, due to some such detailed qualities as these, independently of their capacity to perform the specialized functions connected with the particular sensory or motor areas. If this is the case we have the condition necessary to produce the types of intercorrelations which are found to exist.

Our analysis points to some such formulation as the following. Intelligence is represented in behavior by the capacity of the individual to adjust himself to new situations, to solve new problems, to learn. On the side of descriptive psychology, intelligence is exhibited especially by capacity for carrying on the higher mental operations, for abstract thought, for dealing with symbols, for generalizing and for reasoning. If we analyze the types of operations which characterize intelligence we discover an underlying principle which fits both the psychological and physiological conditions. According to this principle degrees of intelligence are determined by the general capacity of psychophysical organism for the formation of new patterns among the elements of experience.

### III. The Distribution of Intelligence

#### FORM AND DISTRIBUTION OF INTELLIGENCE<sup>5</sup>

*E. L. Thorndike*

The orthodox doctrine is that the form of distribution of intellect in human beings of the same sex and age is Form A, shown in the Figure 22 representing a fact whose variations up and down from its average condition are caused by a large number of uncorrelated factors each of which exercises about the same amount of influence on intellect as any other, and being a surface enclosed by a curve approximating the normal probability curve. . . .

This doctrine was urged by Francis Galton, on the basis partly of analogy with the facts in the case of certain bodily dimensions, and partly of his own shrewd observations of human abilities. Since his day it has gained very wide acceptance. This is partly because the measurements of intellect and of other mental abilities in children of the same age (their units being taken at their

<sup>5</sup> From E. L. Thorndike, *et al.*, *The Measurement of Intelligence*. New York: Teachers College, Columbia University, Bureau of Publications, 1926, pp. 270-271; 285-287.

face value) have uniformly shown continuity clustering around one mode, with diminishing frequencies in proportion to remoteness from that mode, and with no notable departure from symmetry toward any one special form of asymmetry. It is partly because some assumption had to be made in one investigation after another for purposes of quantitative treatment, and this assumption was about as safe as any other one assumption, and much easier to operate with. Hence we gradually slid into the habit of using the doctrine. This

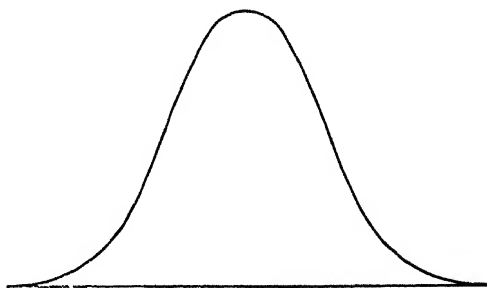


FIG. 22.—Form A The Normal Probability Surface. (E. L. Thorndike, *et al.*, *The Measurement of Intelligence*.)

fashion became so strong that in recent years psychologists have assumed symmetry, even though the units taken at their face value produced a markedly skewed distribution.

The ability which is measured by the score of any one of the commonly used intelligence examinations is thus shown, *by converting the scores into equal units*, to be distributed in children of the same age (from 11 to 14) in rather close approximation to Form A. There are no demonstrable departures from unimodality or from symmetry; the decrease in frequency as we pass from the mode is slow, then more rapid, and then slow again.

It is reasonable to infer that the form of distribution which is found for these examinations scores, when transformed into a scale with equal units, will be found with very little change for any valid measures . . . of any representative sampling of intellectual tasks. It is reasonable to carry the inference on to any valid measures of the histological and physiological basis of altitude of intellect. It is probably safe also to extend the inference back to ages eleven to one, since there is no evidence that mortality from one to twelve is selective in respect of altitude of intellect to any considerable extent, or that the environment acts during those years to reduce and counteract tendencies to multimodality, skewness, and other departures from Form A. With a little less assurance, we may extend it back to the germ cells and assert that to a close approximation, the original capacities of white children in the United States to manifest given altitudes of intellect are distributed in a surface that is approximately unimodal, symmetrical, and of Form A.

## IV. The Measurement of Intelligence

1. EARLY TESTS OF INTELLIGENCE <sup>6</sup>*Joseph Peterson*

*Most of the experimenters before Binet and Henri* put the emphasis on sensory discriminative functions, reaction times, and certain other particular functions. Galton had suggested that there may be a relation between sensory discrimination and general intellectual ability and had devised for weight discrimination, association, and memory span certain tests that could be carried out quantitatively. His influence on early tests in America is obvious. . . . Such tests, like his own, attempted to take some simple function and to study it with great accuracy. The simple functions, as opposed to the complex ones, were held, rightly in the main, to yield the more constant or reliable results; and so they seemed to many investigators the more suitable for scientific testing. This was in line with the objectivity of the anthropometric measurements which were usually closely associated with mental tests. Thus Cattell and Farrand had expressed their preference for the more definite and simple tests over the more complex ones which needed much research and careful analysis before their results could be interpreted.

Gilbert's tests were all subject to exact numerical measurements. The "voluntary motor ability" was determined by measuring the number of taps the subject could make on a suitable piece of apparatus in five minutes, and fatigue was measured by the proportion of loss of speed after forty-five seconds. Reaction times, both simple and discriminative, were measured with a chronoscope in hundredths of a second. The "force of suggestion" was determined by the difference in weights picked out by the child to match respectively a large and a small object of equal weight. Memory of time intervals was measured by letting the chronoscope run for a certain period of time and then, in a second trial, having the subject stop it when it had, in his estimation, run an equal period of time. There could be no question as to the objectivity of such tests. Similar definiteness and precision characterized the tests by Jastrow and those by Münsterberg. All these tests in America reflect clearly, besides the influence of Galton, that of the German experimental psychology, which had taken hold of so many of the early American psychologists who had been students of Wundt.

In the work of Kraepelin and Oehrn exactness of measurement is also emphasized. Strict time records were kept in the various measurements, and their mean variations in different individuals were investigated; however, these tests demanded little apparatus and no highly refined technique. They approached more closely than did the early American tests the normal processes in daily life. Really only the method here is simple, and this is true merely because a succession of similar responses is studied rather than the simple

<sup>6</sup> From Peterson's *Early Conceptions and Tests of Intelligence*, pp. 97-99; 101; 169; 214. Copyright, 1925, by World Book Company. Reprinted by permission.

reactions separately. For example, Kraepelin in studying reaction time would have his subjects add single digit numbers, write from dictation, read a given selection as quickly as possible, etc., and he would time each entire series of acts. This method is obviously much simpler than measuring one's simple reaction with a chronoscope, but the responses of the subject require more complex adjustments and approximate therefore more closely the reactions in our daily work. Kraepelin's work was of course based on a rather thorough study of abnormal individuals, but his tests were supposed to evaluate certain mental qualities in normal individuals as well. It is, however, significant that his greater interest in the individual, forced by the nature of his work, is associated with less use of the sensory tests than was made in the American testing.

Binet and Henri objected to sensory discrimination tests, which had at that time been most extensively used from the time of Galton's beginning. They admitted that these tests are more simple and objective than the tests of the higher complex functions, and that they can be repeated by different investigators under more nearly identical conditions. Likewise they objected to various tests of particular memories, reactions, etc. . . . They maintained that these elementary processes are precisely the ones in which persons differ least; that individual differences are most marked in the complex and higher processes which usually distinguish the everyday activities of one individual from those of another. While these processes are admittedly more difficult to investigate by experimental methods and will therefore give more variable results, it was maintained that tests of such complex functions are relatively much more significant and that the demand for precision is therefore not so great as it is in the case of the simple processes.

The fundamental idea in their psychological method Binet held to be what he called a metrical scale of intelligence. "This scale is composed of a series of tests arranged in order of increasing difficulty, beginning at one end with the lowest intellectual level that one can observe and extending at the other to the level of average and normal intelligence. To each test corresponds a different mental level." Binet asserted that this scale will not, properly speaking, permit of a measurement of intelligence—because intellectual qualities are not measurable in the way that lengths are, since they are not superposable—but only of a classification, an arrangement into a hierarchy of different intelligences. In practice this classification approximates a measure. Thus in testing any two individuals we can determine with the scale not only which of them is higher in intelligence and how many degrees, but also how each one compares with the average of other individuals considered as the norm and how much he is above or below this average. Thus, knowing the intellectual development of normal children from year to year, or having the norms of their mental growth, we shall be able to determine in the case of any child how many years he is behind mentally, or in advance, at a given time; and we can determine, moreover, to what degree on the scale idiocy, imbecility, or moronity belongs.

The authors assure us that the tests which they propose in this scale [the 1905 scale] have been tried out many times and retained, while others, after similar trials, have been discarded.

We must not overlook the important fact that the completion of the 1908 scale marks a step in the progress in intelligence testing that is surpassed only by the appearance of the 1905 scale, which not only established the possibility of such a scale, but outlined the general plan to be followed in its construction. The correction of the inevitable errors in such a work is but a secondary matter, and was sure to follow. The two things about this new scale that gave it the advantages which subsequent years have shown it had over all other mental-testing devices to the date of its appearance, are doubtless these: first the adoption of the method of simple mental age units, easily understood, even by nontechnically trained persons; and, second, the application to each subject of several tests calling into play a variety of mental functions.

## 2. MAKING AND USING AN INDIVIDUAL MENTAL EXAMINATION <sup>7</sup>

*Coleman R. Griffith*

[Instead of making a list of all possible stimulus-patterns for children of each age, a drastic cut is made in the list by selecting for each age group a set of items,] none of which could be reacted to by some of our subjects, all of which could be reacted to by others, and a part of which could be reacted to by the majority. In other words, we would have obtained a list of items which could be taken as a reasonable or representative substitute for a much larger list but which would, at the same time, give us some clew to the average ability of three-year-olds.

As a typical example of such a list let us name the items that are contained in the Stanford Revision of the original Binet-Simon tests. In the Stanford Revision, a three-year-old child is asked to point to several parts of its body, viz., the nose, the eyes, the mouth, and the ear; it is asked to name four familiar objects, viz., a key, a penny, a knife, a watch, and a pencil; if a simple picture has been laid before it, the subject is expected to identify several objects in the picture. A three-year-old should be able to give its sex, give its last name, and either repeat a sentence of seven syllables or repeat three digits in order.

The student will see at once that the sentence, "Where is your nose?" is one of the stimulus-patterns that might have been put into [a longer list]. Keys, pennies, knives, watches, pencils, and the objects that might be included in a common picture are likewise items that would have been included in our long list. If a key is laid before the child with the question, "What is this?" and the child answers, "A key," it has made a suitable or acceptable response to the situation.

<sup>7</sup> From C. R. Griffith, *An Introduction to Educational Psychology*. New York: Farrar & Rinehart, Inc., 1935, pp. 546-549.

In short, then, the list of items included in the test for the three-year-old child is just such a list as we were searching for above. Not all children can answer all of the items in the test. A good many children can answer all of the items but cannot answer any that belong in the four-year-old list. A few children can answer all of the three-year-old tests and a considerable number of the four-year-old tests as well. It follows, of course, that if the general method described above is used for each age level from the third to the eighteenth year, some norm of performance will have been established for each age level and the test becomes a test of competence or of ability, therefore, simply because it indicates what the average or the normal child can do. Once the norm has been established, it is fairly easy to discover those children who depart from the norm, either on the side of low levels of competence or on the side of high levels of competence.

*The meaning of test intelligence.*—It is important that the student understand just what is implied in this procedure if he hopes to see what intelligence means and how intelligence may be measured. One thing is fairly certain. The experimenter has not laid out on the table some special faculty or agent which can be called the intellect, the reason, or the mind. On the contrary, he has taken typical samples of the stimulus-patterns with which children at any given age level should be familiar and he has attempted, as a matter of fact, to find out whether they are sufficiently familiar with them to make what we would commonly call an adequate mode of response. The facts that are actually available, then, are facts which come out of the use of stimulus-response patterns. Everything else that is said about the intelligence of a child or of the origins of its intelligence is a matter of inference from these facts.

In the second place, it must be assumed that all of the children who are given an intelligence test must have had the same opportunity to get acquainted with the items used in the test. It is clear that if a child had been brought up in a community which knew nothing about digits, it could hardly be expected to repeat even three digits in order. Moreover, a child brought up in a community where there were no such things as keys, knives, or watches would not be able to identify such objects. It even has to be assumed that all of the children who are used in standardizing the test for a given age level speak the same language. To be sure, the test might be translated into another language, but if this were done, it would have to be made certain that an act of translation did not change the character of the items of a test in the sense of implying objects which might not be as familiar to the children of a foreign country as they are to children in the country in which the test has been devised.

*The intelligence quotient.*—We are now ready to take the third step in the manufacture of an intelligence test. We have, up to this point, secured a fairly small list of items, that is, a list of stimulus-patterns, which are representative of the whole class of stimulus-patterns with which a child of given age might normally be expected to be familiar. Moreover, the items that we have actually chosen are normative items in the sense that they stand on the



border line between all of those items that are completely familiar to children of a given age level and those items which are completely unfamiliar.

Now let us administer this test to two additional children. The first of these children is able to answer three of the items in the first list and one in the second. The second child answers all of the items in the first list and two in the second. According to the provisions of the Stanford Revision, each item that is answered correctly is equivalent to two months in what is called mental age. Since the child is already three years of age, we will simply assume that it is also three years old mentally. It does not, however, answer all of the items which should be answered by a normal three-year-old child. Since two of these items are missed, we must deduct four months from its mental age. It has answered, however, one item in the four-year-old list properly. It should, therefore, be given credit for two months. This means that our first child, although it is three years of age chronologically, is only two years and ten months of age mentally. It has been convenient to translate these two values into a single value by stating the ratio between them. If 34, the mental age of the first child in months, is divided by 36, its chronological age, we get approximately .94 or 94, as it is commonly expressed, as the intelligence quotient of this particular child.

The other child, however, has answered not only all of the items in the list for the third year but two of the items in the list for the fourth year as well. He is to be given credit, therefore, for three years of mental age plus four months. Here again, if we calculate the ratio between mental age and chronological age, we get the value of 1.11 or, as it is more commonly stated, 111 as its intelligence quotient. If a child were to answer all of the items on the three-year-old list and none of the items in the four-year-old list it would be just as old mentally as it is chronologically. In other words, the intelligence quotient would be 100. The value 100, therefore, may be taken as a normal level of intelligence or as a base with respect to which variations in intelligence can be measured.

### 3. THE HEINIS PERSONAL CONSTANT OR KUHLMANN PER CENT OF AVERAGE DEVELOPMENT <sup>8</sup>

*Arnold H. Hilden*

In 1926, Heinis published a law of mental development and a personal constant to express an individual's rate of mental development. Applying this constant to Kuhlmann's data [based on repeated retests of 639 feeble-minded over a period of ten years], he found that where the I.Q.'s of subnormals decreased from year to year, his proposed personal constant (which will hereafter be designated the P.C.) remains constant for all grades.

Heinis expresses the law of mental development as follows:

$$y = b(1 - e^{-\frac{x}{a}})$$

<sup>8</sup> From A. H. Hilden, "A Comparative Study of the Intelligence Quotient and Heinis' Personal Constant," *Journal of Applied Psychology*, 17, 1933, pp. 360-361.

in which the variable  $x$  is the age,  $b$  is 429,  $d$  is 6.675 and  $e$  is the base of the natural logarithm. To facilitate the solution of the problem it is necessary to assume that the point of origin of the curve is at birth. This a purely theoretical consideration, since one could hardly assume that mental development is suddenly initiated at birth, and that prenatal life has had no influence on the mind. Setting the origin of the curve at zero makes possible the calculation of absolute units for mental measurement.

To find the number of units of mental growth attained by the average individual at a given age, substitute the age for  $x$  in the above equation and solve for  $y$ . As a basis for this study the values for  $y$  were computed for all ages in years and months from one month to forty years by means of logarithms to the sixth place. These logarithmic values were corrected to give a smooth series of values. It is believed that the results obtained are sufficiently accurate for any purpose for which they might be used. Using these logarithms of  $y$ , a double-entry table of P.C. values to the fifth decimal place for mental and chronological ages was constructed. Final values were taken only to the second decimal place, to make it comparable to such tables as Inglis' Intelligence Quotient Values. For example, let us suppose a child who is ten years seven months old has a mental age of eight years three months. The corresponding number of units is 341.13 and 304.35 respectively. The P.C. taken to the second place is eighty-nine. [This index tends to remain more constant from age to age than the I.Q.]

#### 4. SCALES FOR GROUP EXAMINATION<sup>9</sup>

*S. L. Pressey and Luella Cole Pressey*

As has been said, to learn to give and score the Binet Scale satisfactorily requires a very considerable amount of study and practice. What is worse—from the point of view of testing economy—the scale can be given to only one child at a time. The performance tests, besides being expensive, are also very uneconomical as regards time. Under such circumstances, the devising of group tests of mental ability was naturally suggested.

The construction of satisfactory group tests involved, then, provision for the answers to be indicated on paper instead of orally as is possible in an individual examination, provision for the simple and rapid recording of answers by those examined so that the time of writing would be negligible in comparison with the time for thought about the test on the part of the one tested, and provision for the rapid scoring of answers by unpracticed scorers in such a way that all scores would give exactly the same credit for the same performance.

These requirements were met by Otis in his first group test by the expedient of providing on the test paper alternative answers to each question, only one of which was correct. This device was adopted by the army for

<sup>9</sup> From Pressey's *Introduction to the Use of Standard Tests*, pp. 154-157. Copyright, 1931, by World Book Company. Reprinted by permission.

use in the army group tests, and having proved successful, has been adopted almost universally in the large number of group scales which have been recently compiled for use in schools.

*General nature of group scales of general ability.*—Evidently such tests must put before the children, on a printed blank, problems of the same general nature as those appearing in the Binet Scale. That is, the tests must not include matter specifically taught in school; they must, nevertheless, require the exercise of "intelligence"—they must involve complex mental processes and ability as great as is required in schoolwork. So these group scales are made up of such matter as the following (quoting from the National Intelligence Tests):

The number of days in a week is    5   6   7   12  
 The kitten is the young of the    dog cat lion sheep  
 The day before Thursday is    Wednesday Tuesday Friday Monday  
 Cheese comes from    butter plants eggs milk

The children are told to "draw a line under the one word that makes the sentence true." Such questions clearly involve general information and avoid specific elements of schooling; they require general ability. The "common-sense" nature of the problems appears more clearly still in such a test as the following:

Do flowers bloom? ..... yes no  
 Are apples good to eat? ..... yes no  
 Are some houses built of stone? ..... yes no  
 Is the sky ever gray? ..... yes no

The children are told to "read each question and draw a line under the right answer." Another test presents such items as the following:

elephant (circus ears hay keeper trunk)  
 mouse (back cat eyes cheese trap)  
 hoe (blade digging garden handle rust)  
 iron (coldness polish rust strength weight)

The directions are, "Draw a line under each of the two words that tell what the thing always has."

The general and common-sense nature of these questions is obvious. They require general ability, practical judgment, mental alertness; they do not require schooling in history or geography, or other special training. The modern group scale of general ability consists of a booklet containing anywhere from four to ten such tests. The great problem in building these group scales is to involve a sufficient amount of material to give a reliable measure; and it is particularly in the effort to put into these examinations a large number of questions without increasing unduly the time required to take and score the scales that the special features of the present-day group test, which make such tests seem at first glance extremely artificial and even fantastic,

have been developed. That is, in these tests directions are cut down to the very briefest minimum; answers are indicated by underlinings or checks instead of writing, and scoring is done by stencils permitting very rapid count of the number of marks correctly placed. As a result of these special features the present-day group scales are, in spite of the fact that they may include two hundred questions or over, thoroughly practicable instruments for use in the public schools.

The results yielded by the group tests have very much the same significance as have the results with the Binet Scale; a high score means a good general ability and a low score a poor general ability for schoolwork or anything else the individual may undertake. However, because of the large numbers which may be tested by means of the group scales, more services may be rendered by them than could be rendered by the more time-consuming and less practicable individual examination. . . . It must not be supposed that group tests of the type above described are capable of as accurate and unequivocal a measurement of mental ability as the individual test.

## V. Level of Mental Ability and Index of Brightness

### I. SCALES INDICATING LEVELS OF ATTAINMENT<sup>10</sup>

*E. L. Thorndike*

We may expect that, in the future, all these group examinations which have proved themselves so convenient in getting quickly and cheaply an approximate measure of something which is reasonably called "intelligence" will retain these advantages and gain those of clearer interpretation by certain changes in the method of construction which are recommended by the principles which we have formulated. Instead of being a collection of small tasks of undefined location as to difficulty, they will be made in levels with a definite number in each level, and the levels will be placed, at least approximately, equally far apart. A more liberal time allowance will be given, and each individual who is examined will be instructed to take as much time as he needs and to go as far as he can. The group test can then be scored by a summation of credits just as now, but that summation will have resulted from a combination of scores of the number right at each of various levels of known difficulty.

All the measurements of intellect which have been made hitherto and which psychologists may expect to make in the future, unless means are found of defining and counting units of connection in the neurones, are inventories. They are records of the degree of success in accomplishing intellectual tasks. If all intellectual tasks are listed and arranged in levels of difficulty, the inventory may be systematized into a record of how many the intellect in question can do at each level and how quickly he can do them. From the record of

<sup>10</sup> From E. L. Thorndike, *et al.*, *The Measurement of Intelligence*. New York: Teachers College, Columbia University, Bureau of Publications, 1926, pp. 408; 469-470.

how many it can do at each level, three useful measures may be abstracted. One is altitude, that is, the degree of difficulty at which a given percentage of success is attained. The second is width, that is, the per cent of successes at any given altitude or the average per cent of successes at any given series of altitudes. The third, which may be called area, is the total number of tasks done correctly, or the percentage which this total is of the number of tasks in the entire list.

## 2. SUBSTITUTES FOR THE I.Q.<sup>11</sup>

*Francis N. Maxfield*

This committee was directed to consider a rather specific question in psychometric practice; namely, the age to be used as the divisor in obtaining intelligence quotients in the cases of subjects fourteen years of age and older. In the discussion on the floor several speakers seemed to imply that the I.Q.'s under discussion were Stanford-Binet I.Q.'s and that nothing else mattered.

The Committee has felt that the question is much broader than this, and that the whole question of the use of I.Q.'s, not only in connection with the Stanford-Binet, but in connection with all tests of intelligence, is involved. The use of the I.Q. has led to much misunderstanding both among clinical psychologists and assistant clinicians, and among those to whom their psychometric results have been reported. It seems that it is full time for this Section to consider the alternative of either modifying practice so that the use of the I.Q. will be open to less objection ("patching up the I.Q.," this might be called), or adopting some substitute. Shall we patch up the I.Q., or turn it in, and get a new model?

The I.Q. has been oversold, and along with it we have foisted on school people, social workers, juvenile court officers, parents, and others, a good many half-truths and misconceptions, some of which may be enumerated as follows:

1. That a "mental age" scale gives us units of mental maturity, and that the mental age derived from one test has the same significance as the same mental age on another.
2. That, for any intelligence test and at any age, there is a normal distribution of I.Q.'s and that the central tendency for these I.Q.'s is 100 in unselected groups.
3. That, for any intelligence test, the I.Q. remains constant.
4. That the validity of any other intelligence test is measured by its correlation with the Stanford-Binet.

The I.Q. as used has not only been misunderstood, but it fails to give any measure of deviation from norms for the test used. The mental age score on a given test may show that the subject is above or below average for his age, but neither this nor the I.Q. derived from it shows how much above or below the average his score may be, as would be the case if some measure

<sup>11</sup> From Francis N. Maxfield, "Substitutes for the 'I.Q.'." A Report by the Committee on the I.Q. Presented at the Meeting of the Clinical Section of the American Psychological Association at the University of Michigan in Sept., 1935. *Educational Research Bulletin*, 15, 1936, pp. 92-93.

of deviation like centile rank, probable error, or standard deviation were used. Miss Stutsman in her Merrill-Palmer performance scale for preschool children has given tables for translating mental age scores into measures of deviation, but most test norms include no such tables.

The use of the Stanford-Binet for subjects over fourteen years of age has given scores so obviously contrary to the assumption that the I.Q. is constant that Pintner and others have suggested a modification of Terman's method of calculation, which has been rather extensively used. They divide the mental age score by fourteen for all subjects fourteen years of age or older. Heinis has suggested his P.C., or personal constant. This seems to give an index more nearly constant than the I.Q., but both of these are methods of patching up the I.Q., and both methods fail to give any index of deviation from the norms for the test in question.

In the opinion of the Committee, it is undesirable to make further attempts to patch up the I.Q.

### 3. A MORE ADEQUATE INDEX OF MENTAL ABILITY

As a more adequate index of ability than either the intelligence quotient or the per cent of average development some measure of variability, such as the standard deviation or the quartile deviation, has been suggested. Such an index would have a definite statistical meaning and at the same time would possess the constancy claimed for the per cent of average development. It could be used only with test scores expressed in terms of some common unit of measurement such as the T-score or C-score. Merely transforming numbers of items correctly done on mental tests into standard deviation or quartile deviation units, as is frequently done, fails to make any improvement in the inequality or inconstancy of the raw test scores and precludes the use of any measure of variability as a meaningful index of expression. The use of percentile ranks in which to express numbers correctly done on mental tests has the same disadvantage as changing raw test scores into standard deviation units: it fails to improve either the inequality or inconstancy of the original crude and varying units.

With the development of such measuring instruments as the C A V D tests of Thorndike or the Unit Scales of Aptitude, the scores on these scales can readily be expressed in terms of a measure of variability. With the inclusion of a very large proportion of all children in the secondary school as well as in the elementary school, this procedure has become feasible. In the case of the Unit Scales of Aptitude the C-scores on each of the separate scales are convertible into quartile deviation units for children of each chronological age. Such indices can be averaged and the averages converted into quartile deviation indices that are directly comparable with the indices on each separate scale. Besides having a definite statistical meaning and possessing a degree of constancy as great, within the limits of errors of measurement, as is possessed by individuals, such indices permit the averaging or even weighting and averaging into single statistically comparable indices the measures on different combinations of tests of a wide variety of functions for purposes of educational and vocational guidance.

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## EXERCISES

1. What is intelligence? Do individuals differ in quantity or quality of intelligence?
2. Define the following concepts: Binet Age, Binet Scale, Binet Quotient.
3. What is the concept of the intelligence quotient? How constant is the quotient? What difference does it make to the classroom teacher whether the I.Q. is constant or not? What substitutes are offered for the I.Q.?
4. Of what value are intelligence tests to the classroom teacher?
5. Is the occasional practice of classifying children into sections on the basis of I.Q.'s a desirable one? Why or why not?
6. What are the uses of group intelligence tests? performance tests?
7. Should a child know his I.Q.? Why or why not?
8. Distinguish between general intelligence tests and aptitude tests.
9. How is intelligence distributed?
10. How may the feeble-minded be identified?
11. What children are generally considered to be mentally gifted?
12. Is there any correlation between delinquency and intelligence? Explain.
13. What is the relation of intelligence to school success? Might intelligence tests more accurately be termed tests of scholastic aptitude? Justify your answer.
14. What factors besides intelligence account for school success?
15. Would it be more accurate to use the adjective form rather than the noun form; for example, is it more accurate to say that the student behaves intelligently than to say he has intelligence?

## CHAPTER XIX

### EDUCATIONAL MEASUREMENTS<sup>1</sup>

G. M. Ruch, formerly of The University of California

#### I. Introduction

Efforts to evaluate the outcomes of organized instruction have developed into a virile movement for measuring educational achievement in the various school subjects. Tests for measuring the speed and comprehension in reading, vocabulary, ability to spell, speed and accuracy in number combinations, ability to punctuate and use correct grammatical expressions, and so on, have been devised, standardized, and extensively used. In fact, teachers and even parents have become so test-minded, so versatile in talking about standards that comparisons of one child with another, one class with another, and one school with another are commonplace. In many schools, anywhere from 50 per cent to 100 per cent of the pupils in any given class are expected to come up to the norm for the test for the country as a whole. Norms are often interpreted as standards. Teachers wish to make a good showing with their pupils, hence they drill or coach their pupils in the content and techniques of tests. These and other mispractices have resulted in untold harm to individuals and society. Let us assume that the norm for the country on a given standard test is 40 for the fifth grade. What of it? It does not tell us what any given school system, what any given fifth-grade class or what any pupil in that grade *should achieve* on that particular test. When tests lead to regimentation, setting the curriculum, and perverting methodology, *we should reconsider what the business of education is*. We must also realize that any sound evaluation of the results of instruction must include consideration of such important psychological outcomes as social functioning, social imagination, social attitudes, standards of value, appreciations, ideals, creative ability, power to generalize experiences, power to apply knowledge to new and changing situations, and the like. Indeed the newer efforts in educational measurements are being directed to these very problems.

#### II. The Origins of Educational Measurements<sup>2</sup>

Leonard P. Ayres

Measurements in education are fifty years old if we count from the oldest beginnings of which we have record. [This was written in 1918.] They are

<sup>1</sup> The readings in this chapter will help students of psychology and education to understand the nature of educational measurements, the uses of tests, their limitations, and the trends. They furnish valuable supplementary reading to chapters in the following: Skinner and Collaborators, *Educational Psychology*, Chapter XVII; Trow, *Educational Psychology*, Chapter VI; Starch, *Educational Psychology*, Chapters VII, XIV, XV, and XXIII; Collings and Wilson, *Psychology for Teachers*, Chapters XXI, XXII, and XXIII; Bagley, *et al.*, *Human Behavior*, Chapter XIII; Pintner, *Educational Psychology*, Chapters XIV, XV, and XVI; Stroud, *Educational Psychology*, Chapters V and XIII; Davis, *Psychology of Learning*, Chapter XVII; Benson, *et al.*, *Psychology for Teachers*, Chapter XV; Jordan, *Educational Psychology*, Chapters XIV and XVI; Sandiford, *Educational Psychology*, Chapter XV; and Gast and Skinner, *Educational Psychology*, Chapter XVII.

<sup>2</sup> From L. P. Ayres, "History and Present Status of Educational Measurements." *The Seven-*



twenty-five years old if we reckon from the time that Dr. Rice, the pioneer and pathmaker among American scientific students of education, began his work in this field. They are ten years old if we begin our count with the earliest efforts of Professor Thorndike, who is the father of the present movement.

We are indebted to Professor Thorndike for having discovered what is apparently the earliest record of work in the field of educational measurements as we now use that term. As early as 1864 a schoolmaster in England, the Rev. George Fisher, of the Greenwich Hospital School, had seen the need and the possibilities of standards, and with prophetic insight anticipated present-day achievements. His practice was as follows: "A book called the 'Scale-Book' has been established, which contains the numbers assigned to each degree of proficiency in the various subjects of examination: for instance, if it be required to determine the numerical equivalent corresponding to any specimen of 'writing,' a comparison is made with the various standard specimens, which are arranged in this book in order of merit; the highest being represented by the number 1, and the lowest by 5, and the intermediate values by affixing to these numbers the fractions  $\frac{1}{4}$ ,  $\frac{1}{2}$ , or  $\frac{3}{4}$ . So long as these standard specimens are preserved in the institution, so long will instant numerical values for proficiency in 'writing' be maintained. And since facsimiles can be multiplied without limit, the same principle might generally be adopted."

[Mr. Fisher assigned similar scale values in the subjects of mathematics, navigation, Scripture, grammar, French, history, drawing, etc.]

Mr. Fisher's efforts seem to have produced no lasting results. Progress in the scientific study of education was not possible until people could be brought to realize that human behavior was susceptible of quantitative study, and until they had statistical methods with which to carry on their investigations. Both of these were contributed in large measure by Sir Francis Galton. . . . Out of his work came much of experimental and educational psychology and, indirectly, educational measurements. It was he who developed the statistical methods necessary for the quantitative study of material which seemed at the outset entirely qualitative and not at all numerical in nature.

[Professor Karl Pearson, in the statistical laboratory named in honor of Galton, has greatly extended the statistical beginnings of Galton. The publication by Thorndike of a textbook in statistical methods in 1904 gave great impetus to quantitative thinking in American education.]

In America the real inventor of the comparative test was Dr. J. M. Rice. Dr. Rice studied in Germany and came under the influence of the German psychologists at Jena and Leipzig. Returning to this country, he became interested in education and one day in 1894 the new idea was born. Of this invention Dr. Rice says: "In truth, however, I came to recognize that this (the claims of school men following different courses of study) was all talk—that no one really knew the facts, because there were no standards to serve

as guides. Then one day the idea flashed through my mind that the way to settle the question was to try it out. For a beginning I decided to take spelling, and on that very day I made up a list of fifty words with the view of giving them as a test to the pupils of the schools as I went on my tour from town to town. I have no record of the date of the inspiration, but I think it was some time in October, 1894."

[The work of Rice subjected him to bitter attacks from the majority of educators. His ideas, however, intrigued E. L. Thorndike, who in 1910 published his handwriting scale. The preceding year one of Thorndike's students (C. W. Stone) published the Stone Arithmetic Tests. Thorndike was also much influenced by J. McKeen Cattell who is generally credited with being the founder of mental tests in America.]

### III. The Credo of Educational Measurement<sup>3</sup>

*E. L. Thorndike*

Whatever exists at all exists in some amount. To know it thoroughly involves knowing its quantity as well as its quality. Education is concerned with changes in human beings; a change is a difference between two conditions; each of these conditions is known to us only by the products produced by it—things made, words spoken, acts performed, and the like. To measure any of these products means to define its amount in some way that competent persons will know how large it is, better than they would without measurement. . . . This is the general credo of those who, in the last decade, have been busy trying to extend and improve measurements of educational products. . . .

This is obviously the same general creed as that of the physicist or chemist or physiologist engaged in quantitative thinking—the same, indeed, as that of modern science in general. And, in general, the nature of educational measurements is the same as that of all scientific measurements.

In detail, however, there are notable differences. An educational product, such as a composition written, a solution of a problem in arithmetic, an answer to a question about history, a drawing of a house or the performance of an errand, is commonly a complex of many sorts of things. The task of measuring it seems more like measuring a house or an elephant than it is like measuring a length or a volume or a weight. A complete measurement of, say, a composition might include an exact definition of its spelling, its usage of words, its usage of word forms, its wit, its good sense, and so on and on; and each of these might again be subdivided into a score or more of component elements.

What we do, of course, is to make not such a complete measurement of the total fact, but to measure the amount of some feature, e.g., the general merit of the composition or the richness of the vocabulary, just as physical

<sup>3</sup> From E. L. Thorndike, "The Nature, Purposes, and General Methods of Measurements of Educational Products." *The Seventeenth Yearbook of the National Society for the Study of Education*, Part II, 1918, pp. 16-17. Quoted by permission of the Society.

science does not measure the elephant, but his height, or his weight, or his health, or his strength of pull. . . .

In the second place, the zeros of the scales for educational measures and the equivalence of their units are only imperfectly known. As a consequence, we can add, subtract, multiply, and divide educational quantities with much less surety and precision than is desirable. Indeed, in a given case, the sense in which one educational product is twice as good or as desirable as another, or in which one task is twice as hard as another, or in which one improvement is twice as great as another, is likely to be a rather intricate and subtle matter, involving presuppositions which must be kept in mind in any inferences from the comparison.

[The zero point in an educational ability is a point on a scale which represents "just not any" skill. The six division examples given below are approximately equal in difficulty as is shown by the fact that roughly 50 per cent of fifth-grade pupils can solve each correctly.

$30081 \div 37$     $4845 \div 85$     $20023 \div 49$     $18497 \div 349$     $22064 \div 56$     $21534 \div 291$

If pupil A should attempt these six examples and get none correct, we could not describe his ability as "zero" in division. He is likely to succeed on such examples as  $8 \div 4$ ,  $52 \div 26$ ,  $600 \div 150$ , etc. The fact that he knows  $8 \div 4 = 2$  clearly places him at a point well above the true zero point. If pupil B solves two of the six correctly and pupil C solves all six correctly, we cannot say that C's ability is three times that of B. Similarly, the fact that pupil D, assumed to be an average fifth-grade pupil, should work three of the six correctly does not mean that he stands at the 50 per cent mark on a scale of ability in division.]

#### IV. Kinds of Educational Tests

##### I. CLASSIFICATION OF TESTS<sup>4</sup>

###### *C. W. Odell*

*Achievement tests.*—An achievement test is, of course, one which measures a pupil's achievement or performance along some line, ordinarily one of the school subjects. "Accomplishment test," "attainment test," and "subject matter test" are frequently used in place of "achievement test." . . .

*General survey tests.*—On another basis tests, especially achievement tests, may be thought of as being divided into three varieties: general survey tests, diagnostic tests, and prognosis tests. A "general survey," sometimes shortened to "general" and sometimes to "survey," test is one that yields merely a general or all-round measure of achievement in one or perhaps several school subjects. . . .

*Diagnostic tests.*—A diagnostic test is, as the name implies, one which may be used to diagnose a pupil's capacity or performance. Therefore it must yield relatively detailed information concerning pupil capacity or achievement

<sup>4</sup> From C. W. Odell, *Educational Measurement in High School*. New York: D. Appleton-Century Company, 1930, pp. 22-25.

in one or more limited fields. The extent to which a test is valuable for diagnostic purposes depends largely upon how narrowly limited the field or fields dealt with are, and how completely each is covered. . . . Tests that may be given within any reasonable length of time cannot be made completely diagnostic, except over very small portions of subject matter, since so doing involves covering every item of knowledge or every elemental ability supposed to have been acquired. . . .

*Prognostic tests.*—A prognosis test differs from both of those just defined in that its function is not to measure pupils' achievement in school subjects, but rather to predict what their probable achievement or success in school, in a vocation or anywhere else, will be. Practically all achievement tests have some prognostic value, although they are not intended primarily for this purpose. There are, however, tests which have this as their primary, and in some cases only, function. . . .

*Practice tests.*—A fourth variety of tests in the school subjects is commonly known as practice tests, or sometimes as instructional tests. Such tests may be standardized, but usually are not. There are usually a large number of tests in a practice series, sometimes one for almost every day of the school year, and usually at least one or two for each week. . . .

*"Tests" and "scales."*—So far . . . the word "test" has been used in a broad sense to refer to all sorts of instruments used for purposes of measurement . . . but there is also a narrower meaning with which the reader should be familiar. In this sense, "test" as opposed to "scale" refers to a measuring instrument . . . intended to secure pupil performances that may be measured or rated. In other words, it is the questions, exercises, or problems . . . to which pupils respond in writing or otherwise. "Scale," on the other hand, refers to a measuring instrument . . . which is used in describing pupils' performances. In some cases a test and a scale are combined in a single instrument, in others they are separate. For example, a series of equations to be solved, such as  $2x = 10$ ;  $3x - 2 = 7$ ;  $5x + 4 = 11x - 32$ ;  $3x^2 - 11x - 77 = 27$ , and so on, each more difficult than the one preceding it and assigned a value or weight on the basis of this difficulty, constitute a test in that they secure from the pupil his performance, that is, his responses to the exercises or attempts to give the correct answers. On the other hand, they likewise constitute a scale, since a pupil's score is determined by the weights of the exercises which he solves correctly, or perhaps merely by that of the most difficult one he solves. In such a subject as handwriting the test and the scale are more distinct.

## 2. SPEED VS. POWER TESTS<sup>5</sup>

*T. L. Kelley*

Important and as yet but partially settled, issues concerned with the nature and significance of the function measured are tied up with questions

<sup>5</sup> From Kelley's *Interpretation of Educational Measurements*, p. 31. Copyright, 1927, by World Book Company. Reprinted by permission.

of "speed" and "power." The ideal speed test, also called the time-limit test, is one composed of homogeneous material; that is, many exercises, all measuring the same capacity and of equal difficulty, given with so short a time limit that none or few of the subjects finish. With such a test the number of exercises done (or correctly done—there is usually little difference in such a test between the number worked and the number worked correctly) constitutes the score. Obviously "speed" is an essential phase of whatever is measured. A good illustration of this type of test is the Curtis Standard Research Tests in Arithmetic, Series B. [A portion of this test appears on page 426.] The ideal power test, also called the work-limit test, is composed of items increasing in difficulty by regular steps, given either with no time limit or with so long a time limit that speed of performance is not a material factor. In some power tests the number of exercises correctly done constitutes the score, while in others the difficulty level reached is the score. Clearly, intellectual mastery, or power to do more and more difficult tasks, is the thing measured. Practically all of the spelling tests are good illustrations of power tests. [The portion of the Stanford Paragraph Meaning Test, as given on pp. 426-427, illustrates a power test, as defined by this writer.]

### 3. TIME LIMITS AS A SOURCE OF ERROR IN TEST SCORES <sup>6</sup>

G. M. Ruch and G. D. Stoddard

There are many test critics who hold that time limits are a source of great injustice to the "slow but accurate" pupil. This is probably true in some cases, how true depending upon the sharpness of time limits. The 90 per cent to 95 per cent rule just given will eliminate most of the force of this criticism. [The rule referred to suggests that a reasonable time limit would be one which allowed from 90 per cent to 95 per cent of the pupils to finish all items within their ability.] Some writers, chiefly laymen in the test field like Walter Lippmann, have claimed that even the poorest student, if given sufficient time, would come to make a high score on many speed tests. Lippmann had in mind the Army intelligence examination Alpha, but other writers have extended his criticisms to all speed tests. [The critics cited do not use the term "speed test" within the meaning given here. The army Alpha test was a time-limit test, not a speed test although the time limits were "sharper" than most modern educational tests provide.]

*"Speed" vs. "power" in tests.*—May and Terman found a correlation of 0.965 upon 510 soldiers for Army Alpha given with regular time limits (which are pretty sharp) and with double time allowances.\* Ruch and Koerth repeated the same experiment, using 122 college freshmen, keeping separate scores for regular time, double time, and unlimited time. The same test was used. The results were:

<sup>6</sup> From Ruch and Stoddard's *Tests and Measurements in High School Instruction*, pp. 341-342. Copyright, 1927, by World Book Company. Reprinted by permission.

\* Psychological Examining in the United States Army," *Memoirs of the National Academy of Science*. Vol. XV, 1921, p. 416.

	$r$	P.E.
Single time with double time .....	0.966 $\pm$	.004
Single time with unlimited time .....	0.945 $\pm$	.007

Some of the subjects worked four or five times the regular time, but in no case did any of the poorer ones (under regular time limits) even approach the scores of the better ones. The gains among those who made high scores under regular conditions were nearly as great under unlimited time as among those who started low, in spite of the fact that the superior students were so near the top of the scale [at the outset] that they had little opportunity to earn additional points.\* [Ruch also experimented with the Stanford Reading and Arithmetic Examinations (Form A of the original series) and found correlations of 0.968 and 0.976, respectively between scores under regular time limits and under unlimited times.† Ruch, like Terman and May, concluded that these findings are evidence that such tests are not primarily speed tests. Freeman, on the other hand has suggested exactly the opposite conclusion.‡]

#### 4. THE WEIGHTING OF TEST EXERCISES <sup>7</sup>

*H. R. Douglass and P. L. Spencer*

Many standard tests are made up of exercises, problems, or questions of unequal *difficulty* and value in order that adequate opportunity for diagnosis and for various degrees of power might be provided, or in some cases, where it was found impractical to obtain exercises, problems or questions of equal difficulty and requiring equal amounts of time for completion. Of this class of tests are the Monroe Standardized Silent Reading Test, the Stone Reasoning Tests, the Kansas Silent Reading Tests, the Henmon Latin Tests, and the Douglass Algebra Tests. . . .

In the scoring of tests where weights [for each separate item] are used, a great deal of time and effort is involved in adding the assigned weights. It is much simpler merely to count the number of exercises, problems, or questions completed correctly. [Thus, in a 50-item test on which a pupil solved 35 items correctly, the teacher scoring the test might have to add 35 such decimal numbers as 0.8, 1.3 2.3, etc., if weighted values have been assigned by the test maker instead of recording the score simply as "35." Easy items are given the small weights and harder ones the large weights, usually upon the basis of the tables of the normal curve or probability integral.] . . . Charters § reported that in the case of his Diagnostic Tests for

<sup>7</sup> From H. R. Douglass and P. L. Spencer, "Is It Necessary to Weight Exercises in Standard Tests?" *Journal of Educational Psychology*, 14, 1923, pp. 109-112.

\* G. M. Ruch and W. Koerth, "'Power' vs. 'Speed' in Army Alpha." *Journal of Educational Psychology*, 14, 1923, pp. 193-208.

† G. M. Ruch, "The Speed Factor in Mental Measurements." *Journal of Educational Research*, 9, 1924, pp. 39-45.

‡ F. N. Freeman, *Mental Tests*. Boston: Houghton Mifflin Company, 1926, pp. 249-256.

§ W. W. Charters, "Constructing a Language and Grammar Scale." *Journal of Educational Research*, 1, 1920, p. 255.

Language and Grammar, the correlation between the rankings of pupils' scores when the items of the test were weighted and the rankings of pupils' scores when no weights were used was something over 90 per cent.

[Douglass and Spencer report correlations of from 0.98 to 0.99 + between unweighted (number right) and weighted scores on the four sections of the Douglass Algebra Tests, the Henmon Latin Tests, the Gregory Language Test, and the rate and comprehension scores on the Monroe Standardized Silent Reading Test. As a result of this work and certain others not reported here, very few tests have appeared in recent years with the individual items weighted.]

## V. Illustrations of Educational Tests

The Curtis Research Tests, Arithmetic, Series B have been cited as *speed* ("rate" or "time-limit") tests. These tests are published as a four-page booklet. *Test 1, Addition*, occupies the first page and consists of 24 examples. The first eight examples of Form 2 are given below. The time limit for the 24 examples is eight minutes. Test 2 (4 min.), Test 3 (6 min.), and Test 4 (8 min.) are devoted, respectively, to subtraction, multiplication, and division of integers. Two scores are possible, the number attempted and the number correct. Such a test is properly a "speed" test since, through preliminary experimentation, all examples are of equal difficulty; hence the score of an individual pupil is entirely, or largely, a function of his rate of work since all examples are presumably within his ability.

### 1. THE CURTIS RESEARCH TESTS, SERIES B<sup>8</sup>

#### *S. A. Curtis*

You will be given eight minutes to find the answers to as many of these addition examples as possible. Write the answers on this paper directly underneath the examples. You are not expected to do them all. You will be marked for both speed and accuracy, but it is more important to have your answers right than to try a great many examples.

127	996	237	386	186	474	877	537
375	320	949	463	775	787	845	685
953	778	486	827	684	591	981	452
333	886	987	240	260	106	693	904
325	913	354	616	372	869	184	511
911	164	600	261	846	451	772	988
554	897	744	755	595	336	749	559
167	972	195	833	254	820	256	127
554	119	234	959	137	533	258	323

The New Stanford Achievement Test is typical of the *power* or "work-limit" test or scale. Test 1, Reading: Paragraph Meaning, Form W, is reproduced below in part. This test is a "battery" of ten separate tests: two reading tests, one spelling or dictation test, one language usage test, one literature test, one history and civics test, one geography test, one physiology and hygiene test, and two arithmetic

<sup>8</sup> From S. A. Curtis, *Standard Research Tests, Arithmetic, Series B*, Form 2. Detroit: Published by the author.

tests. The items of all of the ten tests have been arranged experimentally in order of increasing difficulty, i.e., they have been "scaled" but not "weighted." The time limits are fairly generous in order to keep the speed factor to a minimum. The majority of pupils have time to complete all items within their power. The ten tests have been equated to the same set of norms, a fact which allows the plotting of all ten scores (and the composite of the ten) graphically as an "educational profile" (provided on the reverse side of the title page) for filing among school records. Such a battery is diagnostic only in a very general way: (a) abilities are measured separately for the several school subjects; and (b) two aspects of reading (paragraph meaning and word meaning) and two aspects of arithmetic (computation and reasoning) are measured separately. This battery is often used for prognosis; performance at the end of one school year (survey function) is used as a basis for sectioning pupils into superior, average, and inferior groupings at the beginning of a subsequent school year (prognosis function).

The paragraphs reproduced below represent every eighth paragraph of Test 1. The complete test contains eighty blanks to be filled by the pupil. The time limit for Test 1 is twenty-five minutes and the working time for all ten tests is one hundred and fifty minutes. The score is simply the number of blanks correctly filled. There are five forms of this test, known as Forms V, W, X, Y, and Z.

## 2. THE NEW STANFORD ACHIEVEMENT TEST<sup>9</sup>

*T. L. Kelley, G. M. Ruch, and L. M. Terman*

### TEST 1. READING: PARAGRAPH MEANING

DIRECTIONS: Write JUST ONE WORD on each dotted line.

SAMPLE:

Dick and Tom were playing ball in the field. Dick was throwing the ball and . . . was trying to catch it.

1 Fanny has a little red hen. Every day the hen goes to her nest and lays an egg for Fanny to eat. Then she makes a funny noise to tell Fanny to come and get the .

15-16 Mary's doll and picture book were quarreling. "Mary loves me better than she loves you," said the doll. "No, she loves me the better," said the picture book. When Mary heard them she said, "You are both mistaken. I . . . one of you as much as the . . ."

33-34 Sand is rock ground fine. The miles of white sand that cover our beaches by the sea-shore have been made by the restless waves which in the course of long years have . . . the . . . into fine particles.

47-48-49 The burro, a small pack animal, is humorously called the "Rocky Mountain Canary." The mountain country is so rough and the trails are so steep and narrow that many . . . are used to carry the packs of the

<sup>9</sup> From Kelley, Ruch, and Terman's *New Stanford Achievement Test*, Form W, pp. 3-5. Copyright, 1929, by World Book Company. Reprinted by permission.



Every morning at sunrise they bray long and loud. This explains why they are called

64-65 A whale is not a fish, even though it does live in water. A fish has no lungs, is cold-blooded, and absorbs oxygen from the water through its gills; but a whale is warm-blooded and has a genuine set of lungs. In consequence, in bodily structure the \_\_\_\_\_ is \_\_\_\_\_ like a shark, which is a true fish, than it is like a horse.

79-80 "A member of the weaker sex made the eagle scream in her laudations of the father of his country." In plain English this is equivalent to, "A \_\_\_\_\_ George Washington."

## VI. Uses of Tests <sup>10</sup>

G. M. Ruch and G. D. Stoddard

*The major uses of standardized measures.*—Educational and mental tests have proved useful in at least five principal directions in high school teaching and administration. These applications may be classified for convenience as follows:

- I. Supervision and administration of instruction
- II. Diagnosis of special difficulties
- III. Grading, promotions, and sectioning of classes
- IV. Research purposes
- V. Motivation of learning

*Importance of tests in school supervision.*—The use of tests for the supervision of instruction has been the most important function of such measures and includes a wide variety of uses, viz., general surveys of teaching efficiency, studies of pupil progress, comparisons between school systems, comparisons of schools or classes within the same system, comparisons of the accomplishment of individual pupils with norms of average performance, etc. . . .

City school surveys like those of Butte, Cleveland, Gary, and Salt Lake City have made extensive use of educational tests, the tests employed in some cases being constructed for the occasion.

The central feature of testing in supervision is the *reference to a norm or standard of pupil performance*. . . .

Reference to a norm or standard may be thought of as similar to the use of a "control group" in scientific experimentation. The pupil, class, or school system is compared in performance with a larger outside group which represents a balancing of the factors arising from differences in types of teaching, textbooks, geographic and local school conditions, teacher skill, pupil motivation, etc. For this reason, norms, at best, are very crude guides to what is a reasonable performance for a given pupil, class, city, or other unit.

<sup>10</sup> From Ruch and Stoddard's *Tests and Measurements in High School Instruction*, pp. 8, 9, 10, 18-19, 28-30, 43-44. Copyright, 1927, by World Book Company. Reprinted by permission.

*Classification of supervisory uses of tests.*—The problems of supervision which offer opportunity for the application of mental and educational tests include the following:

1. The measurement of pupil progress
2. The diagnosis of teaching efficiency
3. Setting up of standards of performance
4. The objectification of records of performance

*The requirements for diagnostic tests.*—The term *diagnostic test* has been used in a very loose and misleading manner by test workers. Diagnosis is, of course, a relative term, but it is nevertheless capable of definition. . . .

The following statements characterize genuine diagnosis as a practical [group] test situation:

- (1) The school subject to be diagnosed must be broken into all of its important constituent unit skills or aspects, and each of these must be measured separately.
- (2) Each of these units must be sampled widely enough (i.e., be covered by enough test items) that no important facts or skills are omitted.
- (3) Each of these units . . . must be provided with separate norms for the interpretation of scores by units.
- (4) The score yielded by each unit of the total tests must be reliable enough to stand alone as a score on an *individual* pupil in contrast with group measurement.
- (5) No tabulation of individual errors should be required in order to arrive at a diagnosis.
- (6) The analysis into units should be carried far enough that each unit parallels a unit in the course of study; i.e., represents some one teaching unit.
- (7) The diagnosis should suggest the remedial or corrective program which should follow the diagnostic testing.

*Tests in determining promotions.*—Educational tests are always valuable in supplementing school marks and teachers' judgments in determining promotion or nonpromotion. The greater freedom of the tests from personal biases, their greater reliability, and the availability of norms eliminate much of the uncertainty attending decisions about promotions based on the usual data.

Tests should be used to *supplement* rather than to replace the more usual methods of promotion. It might not be defensible to argue that all pupils should be given educational tests in all subjects as a part of the final examinations, but the statement that *all backward and doubtful cases should be tested before a final decision is made relative to promotion* is not without a sound basis. . . .

One further point about promotions and failures should be borne in mind in connection with all test and examination practices. *The primary aim of all examinations, tests, or school marks is that of ranking the pupils in the approximate true order of merit upon a scale of ability.* No grading system, whether it be the traditional 100 per cent scale or the A, B, C, D scheme, can possess any greater refinement from the standpoint of measurement than is possessed by the underlying arrangement of pupils in rank order of achievement. The rank orders are the fundamental measures; the per cents or letters finally assigned are at all times artificial labels having no claims to validity not inherent in the rank orders.

To summarize: the rank orders answer the question as to *who*, if any, are to fail; the school authorities agree as a matter of pure definition *how many* [if any] are to fail. It is true, however, that a thoroughly trustworthy educational test will often be of material aid in deciding such issues.

*Sectioning of high school classes.*—The high school with an enrollment of one hundred fifty or more pupils usually must face the question of class sectioning. If there are fifty or more entering ninth grade, there will be two or more sections in English, mathematics, history, and probably science and foreign language. The older practice managed this sectioning chiefly as a matter of avoiding conflicts in pupils' schedules and permitting free choice on the part of pupils. With the growth of our knowledge about the range of individual differences it soon became evident that sectioning of classes offered an opportunity for segregating pupils into relatively homogeneous groups, i.e., groups of approximately equal learning capacity and progress rates. . . .

[The foregoing is written in terms of the high school but is equally applicable to the elementary school. Educational and mental testing has shown that the pupils in a given school show a range of ability equivalent to four or five school grades, unless homogeneous grouping has already been accomplished. Thus, in the fifth grade, for example, there will be pupils of abilities equal to those of the average third, fourth, fifth, sixth, and seventh grade pupil; at times the range is even greater. It is manifestly impossible to adopt any one course of study or teaching method for such a diverse group.]

*Motivation as a neglected aspect of testing.*—When educational measurement was in its beginnings, it was a common practice for the superintendent to keep the sole set of test records on file in his office. Gradually the practice grew of making these records available to the classroom teacher as well. The next step, and an important one, is that of *placing the test records before the child as an incentive to improvement.*

Learners improve most rapidly when their successes and failures are known to them at the time of practice. This principle, which may be termed the "principle of learning with knowledge of results," is one of the most effectual motivators known to students of the psychology of learning, and the standard test record offers a crucial opportunity to capitalize on a motivating situation of great force.

The pupil should be allowed to keep his own record, preferably in the form of a graph, and to record each score. It is wise to place the emphasis on the pupil bettering his own record than on the bettering of the published norm, since there will always be backward pupils who cannot reasonably expect to surpass the test norm but who can better past records.

## VII. The Selection of Tests

### I. CRITERIA FOR THE CHOICE OF TESTS<sup>11</sup>

*P. M. Symonds*

Criteria of a good test may be discussed under the following heads:

- |                              |                               |
|------------------------------|-------------------------------|
| I. Validity                  | V. Cost                       |
| II. Reliability: Objectivity | VI. Ease of Scoring           |
| III. Scaling                 | VII. Duplicate Forms          |
| IV. Norms                    | VIII. Standardized Directions |

The first concern of one who wishes to choose a standardized test is to make sure that the test really measures what it purports to measure. The adequacy and detail with which a test is a measure of a trait, function, or school subject is called its validity. Validity is measured or determined by the correlation of scores on the test with some independent criterion of the school subject in question. . . .

In the case of achievement tests most of the validation of the test must be accomplished in the original choice of material of the test. Concerning the principles of the choice of material there is much confusion, particularly in subjects which are now in a period of development or transition. Should the test attempt to measure some typical course of study as represented by average textbooks or examinations used in the country or should material representing progressive experimental courses be selected? If standardized tests were used solely as measuring instruments, probably the former type would be more desirable, but the truth is that standardized tests also set up in the minds of teachers standards for the selection of material and instruction. For this reason they ought to represent in some degree forward-looking tendencies in curriculum development. [The author lists six methods of validation, viz., criterion of extrinsic use (often called the doctrine of "social utility"), the criterion of errors (the basing of items on very frequent pupil errors), composites of textbooks, composites of courses of study, composites of teachers' examinations, and judgments of experts.]

The second most important criterion of a test is its reliability. Indeed it is perhaps as hard to construct tests with the desired reliability as with high validity. Kelley states the principle, "If the testing time is of necessity brief, give prime consideration to the reliability of the test, and if the testing time

<sup>11</sup> From P. M. Symonds, *Measurement in Secondary Education*, 1927, pp. 278-279, 287, 289, 290, 292, 300, 302-303, 304, 305, 306. By permission of The Macmillan Company.

is long, give prime consideration to validity and but secondary attention to the reliability of the test," . . .

Reliability refers to the correlation between the results of two forms of the same test. It is the accuracy of the test. Unreliability is best exhibited by giving an alternate form of a test and noting the change in score. A perfectly reliable test is one for which the score on a second trial remains exactly the same as on the first trial (barring practice effect). A perfectly unreliable test is one where the scores on two successive repetitions of a test are such as might occur by pure chance—such as one might draw out of a hat containing a number of possible scores. In estimating reliability we are not concerned with repeating the identical test, but in giving a test having the same construction, form, and subject matter as the original test but having different items. [The term, "form," as applied to tests has a technical meaning. If a teacher should construct, say, two hundred items in chemistry and then deal these into two piles in a random manner, the resulting two lots of one hundred items each should approximate equal forms. However, in standard test construction the more refined practice would be to give these two hundred items to a large number of typical pupils and then pair them off into two forms by use of the per cents of right answers on the items. In this way item 1 in each form would be approximately equal in difficulty and item 2 in each would be about equal in difficulty, but slightly more difficult than item 1. This procedure would be carried out for all items, resulting in (a) an equation of the two lots and (b) the arrangement in order of increasing difficulty (a simple type of "scaling" of the items).]

*Objectivity.*—When the judgment of the scorer enters into the determination of the score, the test is called subjective. A subjective test must be unreliable, for it is obvious that the very same test paper may be scored differently by two different scorers or by the same scorer at two different times. [One investigator asked 115 English teachers to mark the same examination paper in English. The range of scores was from 50 to 98. Similarly, 115 mathematics teachers marked the same geometry paper all the way from 28 to 93.]

*Length of the test.*—One of the most potent factors in determining reliability is the length of the test.

Two questions give more reliable information of a person's knowledge or ability than one. A test with fifty items gives a more reliable estimate of a person's ability than a test of twenty-five items. The effect on reliability of increasing the number of questions is known mathematically—there is a definite and precise relation between the reliability of two similar tests of different lengths. . . .

*Condition of the pupils taking the test.*—McCall divides the causes of test unreliability into factors inherent in the test itself and factors inherent in the pupils taking the test. . . . Most people feel that strain or nervousness or a physical condition not quite the best works havoc with their performance on

an examination. . . . [The writer quotes a number of authorities on this moot question and submits results of his experiments. His conclusion is, "on the contrary, not one of the 232 school children showed any appreciable unreliability in tests due to this personal factor." The evidence to date is conflicting; it may be that adults are more subject to effects of nervousness and strain than children are. In most schools today the administration of tests is such a commonplace matter that these effects are ordinarily not large.]

A scaled test is one in which the items of the test progress according to some quality such as difficulty, aesthetic quality, legibility, etc. A test scaled on the basis of difficulty is one in which each item is more difficult than the preceding one. Most standardized educational tests are scaled on a basis of difficulty. . . .

There has been much misapprehension concerning the scaling of tests. In general, the scaling of a test has been much overemphasized in past discussions. It is surely important that handwriting, composition, sewing, and drawing scales be accurately scaled. In the past, however, much effort has been spent on the scaling of a test which might more profitably have been spent in making the test thoroughly valid and reliable. . . .

A standardized test without norms is practically useless. . . . Norms or standards are essential for interpreting the results of a test. A class average should be compared with the norm or average performance of other groups. . . . Most publishers include the norms in the manual of directions accompanying the test or on the tabulation entry sheet which they sometimes provide. Select tests for which there are satisfactory norms derived from a large number of cases. This is evidence that the test has been widely used. . . .

Probably no teacher or school administrator needs to be told to select an inexpensive test. There is little or no correlation between the price of a test and its value as a test. . . .

A test should not be primarily selected because it is easy to score, but at the same time a good test ought to be as easy to score as possible. Publishers usually distribute scoring keys with standardized tests. The key should be printed as near to the margin of the paper as possible so that it can be brought close to the pupil's answers. It should be spaced exactly as the material is spaced. . . .

The best standardized tests are made with two or more duplicate forms, and test users should insist on using tests that have alternative forms for several reasons. If it is desirable to repeat a test during the course of the year's work, there will be no danger if previous test items have been looked up in the meantime and remembered. Another reason is that oftentimes a teacher wishes to measure his class with greater reliability than a single test affords and alternative forms provide an easy way of immediately extending the length of a test. The author of a test needs at least two forms to determine the reliability. . . .

Directions are particularly needed in speed tests, but in our ordinary content examinations in the high school, directions may be reduced to a

minimum with no derogatory effect upon the score. Also it is probably true that variations from the exact printed directions have less effect than was once commonly supposed.

## 2. INTELLIGENCE TESTS VERSUS ACHIEVEMENT TESTS<sup>12</sup>

*T. L. Kelley*

One of the most frequent questions arising in connection with the test program is whether to use an intelligence test or an achievement test. The answer cannot be given finally with our present knowledge, for usually the tester does not know whether the intelligence and the achievement tests being considered measure the same or different traits. It has commonly been found that the two tests do not correlate perfectly, but this may of course be due simply to the chance errors involved in each. When allowance for chance errors is made, the correlation between a good battery achievement test and an intelligence test is found to be very high. If a number of children have been together in the same school for a number of years, it would seem the part of wisdom to judge both their general ability and their accomplishment and to compare one child with another by means of a good achievement test. If their antecedent histories are quite different—e.g., if they are transfers from other schools or if they had private instruction—it then would be well to judge of general ability and fitness for further work by means of a good general intelligence test. . . .

On the average, in the neighborhood of .90 of the capacity measured by an all-round achievement battery score—reading, arithmetic, science, history, etc.—and of the capacity measured by a general intelligence test is one and the same. . . . The writer is compelled to advise against the common use of an intelligence test and an achievement test for the purpose of drawing conclusions as to the differences found within the individual on the two tests.

## VIII. Educational Quotients

In 1920 R. Franzen devised the "accomplishment quotient," using formula  $AQ = \frac{EA}{MA}$ . The *EA* represents educational age, i.e., the score from an educational test is expressed in terms of age norms. The *MA* is the mental age from a general intelligence test. Age norms (for either educational or mental tests) are obtained by giving the test to a large number of unselected pupils of successive ages. The average score earned by each age group is then computed. The average score of twelve-year-olds, for example, is taken as representing twelve-year ability (educational or mental). The following fictitious figures will illustrate the meaning of age norms.

Age group	7	8	9	10	11	12	13	14
Average score	50	64	76	84	90	95	99	102

<sup>12</sup> From T. L. Kelley, *op. cit.*, pp. 18, 21-22.

A pupil earning the score 57 obviously falls between an *EA* or *MA* of 7 and 8 years. By interpolation it is found that his score lies halfway between. His *EA* or *MA* would be given as 7-6, meaning 7 years and 6 months. If his *EA* were found to be 7-6 and his *MA* to be 8-9, his accomplishment quotient (*AQ*) would be 7-6/8-9, or 7-5/8-75, or about 86. (It is customary to drop the decimal point.) Such a pupil would be regarded as not accomplishing up to his mental ability. This notion of the accomplishment quotient was very popular from 1920 to 1925. It assumes that intelligence is the principal or sole factor in learning. The weakness of this assumption has been pointed out by many writers. If, as Professor Kelley has stated, educational and mental tests measure functions which are 90 per cent identical, such a quotient is meaningless. There is another type of educational quotient which does seem to have real value, viz.,  $\frac{EA}{CA}$ , where the educational age is expressed as a ratio to the *CA* or actual age of the child. Such a quotient is analogous to the *IQ* from mental tests.

### THE ACCOMPLISHMENT QUOTIENT<sup>13</sup>

*T. L. Kelley*

This, of course, implies the discarding, as far as individual diagnosis is concerned, of such a concept as the achievement-intelligence quotient. [The writer refers to the "accomplishment quotient."] This may seem to be radical curtailment of a widespread interpretative concept. In one sense it is, for if achievement-intelligence quotients, as determined, below and above 1.00 correspond to real mental structure, important knowledge of the child is available when the quotient is known. More soundly, however, it is no curtailment at all, for it may be shown that with such achievement and intelligence tests as are commonly used, the great majority of such quotients diverge from 1.00 by amounts to be expected as a matter of chance. Thus, at present, eliminating the achievement-intelligence quotient technique is merely eliminating a false guide. [By "chance" the writer refers to the fact that any *EA* or *MA* (or any educational or mental measurement) is in error in greater or less degree. The error is often called chance error. A quotient partakes of the error in both numerator and denominator; in fact the error of the quotients is likely to average larger than the errors in the terms of the fractions.]

### IX. Measurement of Attitudes<sup>14</sup>

*E. B. Silance and H. H. Remmers*

A specific application of the theory developed in the paper by Remmers\* has been made to the construction of a scale to measure student attitude

<sup>13</sup> From T. L. Kelley, *op. cit.*, p. 22.

<sup>14</sup> From E. B. Silance and H. H. Remmers, "An Experimental Generalized Master Scale: A Scale to Measure Attitude Toward any School Subject." Purdue University, *Studies in Higher Education*, 26, No. 4, 1934, pp. 84-86.

\* Remmers, H. H., and E. B. Silance, "A Generalized Attitude Scale Technique." *Journal of Social Psychology*, 5, 1934, pp. 298-312.



toward any school subject. One hundred and fifty affective statements were collected from the following sources: (1) approximately 100 college freshman themes written on school subjects liked or disliked; (2) textbooks on methods of teaching and other educational literature; and (3) statements written by Silance. These statements were mimeographed on slips of paper and sorted by 189 college and high school students and scaled according to the equally-often-noticed-difference principle. Of the 189 sortings, 39 were rejected on the basis of two criteria: (1) If a student had more than one fifth of all statements in one of the eleven scale categories, this was taken as evidence of careless sorting. (2) A few students misunderstood the instructions, in that they assumed that they must think of some particular subject which they had studied and must sort the statements as a measure of their own attitude toward this hypothetical subject. When this was known, either from statements made by the experimental subject or from internal evidence of the sorting, the sortings in question were rejected. Even if all the rejected sortings had been retained, however, the scale values of the opinions, or their variability, would have been affected to a negligible degree.

On the basis of the 150 sortings, two equivalent forms, A and B, of the attitude scale were constructed by selecting 45 pairs of opinions of which the experimental scale values (medians) and measures of variability (interquartile ranges) were respectively as nearly as possible identical.

[The first ten, the middle ten, and the last ten of the 45 scaled opinions of Form A are reproduced here. These selections suggest the ranges of attitudes.]

#### Form A

Scale Value	Q Value	
10.3	1.4	1. No matter what happens, this subject always comes first.
10.2	1.1	2. I would rather study this subject than eat.
9.8	1.6	3. I love to study this subject.
9.7	1.2	4. This subject is of great value.
9.6	1.3	5. This subject has an irresistible attraction for me.
9.4	1.7	6. I really enjoy this subject.
9.2	2.0	7. This subject is profitable to everyone who takes it.
9.1	1.6	8. This subject develops good reasoning ability.
9.0	1.8	9. This subject is very practical.
8.9	1.5	10. Any student who takes this subject is bound to be benefited.
. . . . .		
7.7	1.8	18. I am willing to spend my time studying this subject.
7.6	1.9	19. This subject is not receiving its due in public high schools.
7.3	2.2	20. This subject saves time.
6.8	1.7	21. This subject is not a bore.
6.5	1.9	22. This subject is a good pastime.
6.1	1.2	23. I don't believe this subject will do anybody any harm.

Scale Value	Q Value	
5.8	1.9	24. I am careless in my attitude toward this subject, but I would not like to see this attitude become general.
5.5	0.5	25. I haven't any definite like or dislike for this subject.
4.7	2.9	26. This subject will benefit only the brighter students.
3.6	2.7	27. My parents never had this subject; so I see no merit in it.
.	.	.
2.4	2.3	36. I have seen no value in this subject.
2.2	2.2	37. I would not advise any one to take this subject.
2.1	1.6	38. This subject is based on "foggy" ideas.
1.6	1.9	39. This subject is a waste of time.
1.5	1.7	40. It is a punishment for anybody to take this subject.
1.3	1.8	41. This subject is disliked by all students.
1.0	1.1	42. I look forward to this subject with horror.
0.8	1.0	43. I detest this subject.
0.7	0.8	44. This subject is the most undesirable subject taught.
0.6	0.6	45. I hate this subject.

## X. Defining and Measuring Objectives or Progressive Education<sup>15</sup>

*Ralph W. Tyler*

[In 1935] the general plan for the program of evaluation in connection with the Eight-Year Study was considered, emphasizing the significance of a careful program of appraisal.\* I use the terms "appraisal" or "evaluation," rather than "measurement," because the last may imply only refined and exact assessments. Evaluation is needed by the schools to discover the points at which difficulties are encountered so that modifications or revisions may be made, and to determine the effective aspects of the program which result in noteworthy achievements. The schools need a more comprehensive means of evaluating the progress of pupils so that counseling and guidance may be more effectively and wisely done. . . .

The general procedure proposed for this appraisal program was outlined last year. Since each of the thirty schools in the study is free to develop an educational program which offers greatest promise under the local conditions for the pupils in that school, no single set of tests for all schools was considered, but the plan of evaluation was set up to provide a means by which each school could appraise its work by its purposes. Furthermore, since these schools are concerned with the development of boys and girls in all of the major aspects of life, the evaluation program was conceived not merely as the giving of paper-and-pencil examinations, but as a means of collecting important, pertinent evidence about such development.

<sup>15</sup> From R. W. Tyler, "Defining and Measuring Objectives of Progressive Education," *Educational Research Bulletin*, 15, 1936, pp. 67-72.

\* Tyler, Ralph W., "Evaluation: a Challenge to Progressive Education," *Educational Research Bulletin*, XIV (January 16, 1935), pp. 9-16.

The major task foreseen was the evolution of appropriate appraisal instruments for certain significant aspects of pupils' development which are not covered by the available tests. We proposed to work co-operatively with the staffs of the thirty schools to develop instruments by means of which evaluation of these less tangible objectives might be made. This progress report will indicate the steps which have been taken in the evaluation program proposed last year and will describe the tasks now under way.

The first step taken last year was to ask each of the schools to formulate in clear and understandable fashion its major purposes; that is, to indicate what changes in its pupils the new educational program was expected to facilitate. These statements represented the objectives of the schools, as they were conceived at the time the formulations were made. Each school was then asked to go through the list of objectives and indicate the procedures it was following, if any, for obtaining evidence of the degree to which each objective was being realized. For certain objectives the schools had no satisfactory or practical methods by which the desired evidence might be obtained, and for these new instruments of evaluation had to be developed. Since there were many such, not all of the needed instruments could be attacked at once. From these objectives, five were selected for study because they were mentioned frequently by the schools and because they represented various aspects of pupil development. For each of these five areas co-operative interschool committees, made up of interested teachers from those schools striving for that objective, were formed to assist in developing instruments of evaluation. One committee was concerned with the evaluation of interests and attitudes; a second, with the appraisal of work habits and study skills; a third, with the evaluation of abilities involved in applying facts and principles to concrete situations; a fourth, with the evaluation of the abilities involved in the interpretation of data; and a fifth, with the evaluation of sensitivity to significant problems.

The interschool committees are assigned several functions. In the first place, their task is to clarify the meaning of these objectives. Many of the statements of educational purposes are vague and might mean different things to different people. Before any instruments of evaluation can be developed, the meaning of the objectives must be understood in order that the kinds of behavior which the school is trying to develop may be recognized and effective ways for obtaining evidence of these types of behavior among the pupils may be found.

The task of clarifying educational objectives is more difficult and important than we had realized. In the first place, the terminology typically used in stating objectives is surprisingly vague, and the meanings attached to many of these statements vary markedly among the schools. In the second place, many statements of objectives are expressed in terms of the duties of the school rather than in terms of the changes expected in pupils. Obviously, the latter is the type of statement essential for appraisal, since the task of evaluation is to determine the degree to which these desired changes are taking place.

To express these original statements in terms which would be understood clearly by all the schools concerned and to define these objectives by describing the kinds of changes desired in pupils demand thoughtful discussion, questioning, wording, and rewording.

For example, the phrase "sensitivity to significant problems" was discussed, worded, reconsidered, and reworded, for the schools were using this phrase to mean that they hoped to develop pupils who are aware of significant problems of modern life, who are able to analyze problems indicating the crucial difficulties involved, who are really concerned in the overcoming of these difficulties, and who can develop a plan which is appropriate for their abilities and opportunities for the solution of each problem. These four types of behavior were more clearly understood than the original phrase, and this problem of evaluation was clarified. To appraise "sensitivity to significant problems" we must collect evidence of the degree to which pupils are aware of significant problems, are able to analyze them, are concerned in solving them, and able to plan appropriate action.

As another illustration of the value of definition of objectives, the Committee on Work Habits and Study Skills found it necessary to extend the usual conception of study skills in order to make clear the investigatory skills which these schools are trying to develop in their new work. By this objective, the schools mean that they are trying to develop pupils who are able to determine what data are needed to answer important questions; who are familiar with dependable sources of data; who are able to locate the data in these sources; who are able to obtain information from books and libraries, by observation, by interviewing and letter-writing; who are able to distinguish pertinent data from the irrelevant; and who are able to organize and present the material effectively. This clarification of objectives shows that the schools need not only reading tests and tests of written expression, but also tests covering these other investigational skills.

These two cases will illustrate the need for clarification and the value of the resulting definitions. In any such program the real objectives of the school are essential and not those to which lip service only is given. The formulation of objectives is not an easy task. Sometimes, in our committees we find that schools are frequently tempted to accept glib statements rather than to formulate their own serious purposes. Hence, as we try to define objectives, we do not ask, "What is meant by this phrase?" but, "What does your school mean by this objective?" "What are you trying to accomplish?" The discussion is focused upon the real purposes of the school and not upon the conventional definition of terms.

Sometimes, in visits to the school we sense a purpose which is not expressed. We must ask, "What do you expect to result from this activity?" Only in this way can we clarify some significant objectives which have been so basic to the work of the school that it has never given conscious thought to them, and also those vital purposes which some schools fail to express because of the limitations of our educational vocabulary. The work of the

Committee thus far indicates that vagueness of statement does not necessarily mean vagueness of purpose. This step of clarification is necessary to provide an understanding of the real objectives toward which the schools are striving, and in terms of which the programs of the schools must be appraised.

The next function of the committees was to explore possible methods of collecting evidence about these kinds of changes. For example, one member of the Committee on Interests and Attitudes explored the possibility of obtaining evidence of developing interests by direct observation of young people and the recording of these observations. Another committee member experimented with collecting evidence about interests by the keeping of diaries. A third committee member explored the possibilities of the interview, and a fourth tried types of interest tests. The purpose of this exploratory period was to discover the more promising means for obtaining evidence which might be worth further experimentation, and also to discover the defects which must be overcome and the values which seemed to inhere in each of these possible procedures.

This exploratory use of possible procedures reveals promising general procedures by which desired evidence can be collected. When perfecting a definite instrument to be employed in a particular school, smaller groups or perhaps even one or two individuals work more effectively. For this purpose, a test laboratory has been set up at our staff headquarters at Columbus. This is a laboratory which contains a collection of helpful materials, including promising tests and other instruments, and provides a place where one or two teachers at a time may work intensively with members of the evaluation staff in the construction of actual instruments for use in a particular school.

One misconception of the program which I have heard from several sources is that these thirty schools are not interested in teaching facts and information. This is not true. The objectives from each of the schools show a concern that pupils will obtain accurate and realistic information, not, however, as a matter of rote memorization to be given glibly back to the teacher at examination periods but rather, for effective use. These pupils will be tested to determine the degrees to which they have acquired and can use significant facts and ideas. The emphasis of the evaluation program is upon a comprehensive appraisal—upon the inclusion of instruments to give evidence of the development of these pupils in all the important aspects rather than the mere testing of facts remembered. As the work proceeds we hope to extend the available means of evaluation so that a comprehensive appraisal may be increasingly possible.

During this year, the significance of careful appraisal has become apparent from another point of view. These schools have maintained that the necessary freedom which secondary schools must have in order to reconstruct their curriculums continuously demands liberation from prescribed units and courses and emancipation from imposed entrance examinations, both of which tend to give inflexibility to a program which needs to be highly sensitive to our changing society. But the colleges, on the other hand, do need information

about prospective students, both for the purposes of admission and for purposes of effective guidance after they have been admitted to college. College authorities recognize that the usual transcript of credits and the results on college-entrance examinations are not wholly satisfactory bases either for selection of students or for guidance. They are, however, of some value, and before secondary schools may expect to have the freedom they desire as a more or less permanent policy, a more satisfactory method of appraising students' abilities and potentialities—a method which will provide information helpful to the college in selection and guidance, and, at the same time, will not impose an inflexible and uniform curriculum on the schools must be found. We shall need to follow our students into college and study their efforts in relation to the evaluation data to find out which of these appraisal instruments are useful to the college and, if possible, to improve their value for this purpose.

Appraisal is important in any educational experimentation. The time when arguments and impassioned pleas would justify the wholesale extension of an educational program is past. The significance of the Eight-Year Study must be judged in terms of its effectiveness in promoting desirable educational changes in boys and girls. The purpose of the evaluation program is to develop procedures by which we may determine the changes taking place in these boys and girls and thereby to enable each school to discover year by year the degree to which it is accomplishing its significant educational purposes.

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## EXERCISES

1. Thorndike was quoted in this chapter as follows: "Whatever exists at all exists in some amount." Do you think William A. McCall was justified in adding the following further statement, "Anything that exists in amount can be measured"?
2. In what respects does the measurement of mental and educational products differ from the measurements in the physical sciences?
3. Is it correct to state that a student who made a score of zero on an objective test in educational psychology stands at the zero point of a true measure of ability in this college subject?
4. Does a pupil scoring 6-3 (6 yr., 3 mo.) on a reading test have one-half the skill in reading possessed by a pupil who scored 12-6 (12 yr., 6 mo.) on the same test?
5. Under what circumstances is any educational test prognostic?
6. Would a spelling test of ten words be adequate for the measurement of the spelling ability of an individual pupil? Might it be adequate for a survey of a large city school system?
7. Would the spelling test just mentioned be more open to criticism on the basis of its validity or its reliability if applied to an individual?
8. How would you interpret the following statement: "A test infinitely long is perfectly reliable"?
9. Does it follow that the hypothetical test in question 8 would be perfectly valid?
10. Is the ordinary "essay" college examination primarily a "speed" or a "power" test?
11. Try the eight examples from the Courtis Arithmetic Tests. Allow yourself 2 minutes and 40 seconds (which is the pro rata for eight examples). Do you judge this test to be "highly speeded"?
12. Are any of the exercises of the Stanford Paragraph Meaning Test of sufficient difficulty to cause careful reading and thought for an adult?
13. What is the distinction between validity and reliability?
14. What are the most important factors that influence reliability?
15. What conditions must be met if we are to have similar or comparable forms of a test?
16. Why are duplicate forms of a test desirable?
17. What do you think is meant by the "chance factors" in a test score?
18. A class of pupils was given the one hundred basic addition facts as a test on Monday. On Tuesday they were given the same facts in another order. Few pupils received identical scores on the two tests. Why?
19. Do you see any usefulness for an attitude test such as the one prepared by Silance and Remmers?
20. To what extent should examinations in college subjects be standardized?

## CHAPTER XX

### DIAGNOSIS AND REMEDIAL TEACHING<sup>1</sup>

*E. C. Denny, Iowa State Teachers College, Cedar Falls*

#### I. Introduction

Teachers have always done some diagnostic and remedial teaching. When a teacher by chance or otherwise discovers that a pupil is not doing his work in the way in which she would like to have him do it, she is then approaching the problem of diagnostic and remedial work. With little or no analysis she may proceed at once to tell him what to do in order to remedy his defects. Her procedure may be quite haphazard, unscientific, and incomplete, yet it may often arrive at the desired end result so far as a correct answer or final performance is concerned. During the last several years, however, there has been an effort to apply scientific methods to the problems of discovering pupil difficulties and planning methods calculated to overcome these difficulties and to give the pupil sound techniques in his methods of work. This reveals a tendency to shift the emphasis somewhat from merely getting correct results to the processes whereby these results are secured.

#### I. NATURE AND CAUSES OF DISABILITIES AND THEIR PREVALENCE

It is well to keep in mind that the disabilities underlying poor work or poor techniques may be physical, mental, or a mixture of both. A physician who is called upon to treat an ailing patient first makes a diagnosis in order to discover the nature and causes of the illness so that he may plan a sound program of treatment. His diagnosis is both general and specific; he also takes into account both the mental and physical state of his patient. Likewise, the teacher should make both general and specific studies of the mental and physical condition of a pupil who is failing to make suitable progress.

Some twenty-five years ago a young man who was teaching his first rural school had a pupil who was twelve years old and still in the fourth grade. All forms of reading were very difficult for this girl. In conversation with her previous teacher he was told that she was probably feeble-minded and really incapable of learning, that she would never be able to do more than third or fourth grade work, and that the wise thing to do was merely to tolerate her presence in the school. As the teacher, however, proceeded to observe this girl when she was doing oral reading he was struck with the peculiar manner in which she maneuvered the book in front of her eyes, bringing it up as close as four to six inches, holding it in both hands, alternately raising and lowering the right and left ends of the lines and tilting the page backward and forward at different angles. The teacher also gave her oral drill in the multiplication facts and discovered that these she learned readily. This discovery strongly suggested that the girl was not at all feeble-minded.

<sup>1</sup> The selections in this chapter will help the student understand better the causes of subject disabilities, and how they can be remedied. These readings supplement the limited treatment of educational measurements found in most texts.



Her poor habits of reading further suggested that defective vision might be the real cause of her inability to learn. In conversation with her parents and older brothers and sisters the teacher was assured that there was nothing wrong with her eyes. The girl herself stated that her eyes were all right. The teacher did not accept these statements at face value and finally persuaded the parents to have the girl fitted with glasses. For the first time this girl now began to see with normal vision. Because she had always had dim and blurred vision she had assumed that this was the natural order of things and that everybody else saw things in this same way. In this particular case the proper fitting of glasses remedied this girl's defect so well that even under the ordinary methods of teaching she graduated from the eighth grade within the next three years.

In some cases the teacher may discover that the thing which is thwarting progress is some very minor misconception or wrong technique, the discovery of which quickly suggests its own remedy. For example, a group of college men were practicing in a gymnasium on a series of stunts, one of which was to be able to stand on the hands without moving for at least ten seconds. After several weeks of practice one student not only had not learned this stunt but seemed to be making no progress and had about given it up as hopeless. One day the trainer happened to give particular attention to him and noticed that he was pointing the fingers straight outward. He told him this was wrong and that he should place the hands so that the fingers were straight forward. That same day this student learned the trick of standing on his hands for the required ten seconds.

In contrast to these examples, the diagnosis may be long and tedious and almost impossible to work out in any completeness, and the program for remedy may be one that will require a large amount of work, a vast amount of patience, and a long time to complete.

In order to see something of the widespread extent of poor habits of work one has but to observe a few recitations in nearly any classroom or to engage almost any group of teachers in conversation on the topic. The writer was once watching the early season basketball practice of a college freshman. This young man was some six feet, two inches tall, strong of limb, and well set up physically. The writer remarked to the coach that he had a very promising candidate in this freshman. The coach's reply was, "Well, yes. But he has an awful lot to unlearn." The coach then went on to explain that this young man had a lot of native ability but had played basketball for four years in high school with little or no coaching, with the result that his methods were all of the pick-up variety and that it would take at least a full year to overcome the wrong methods and to give him sound methods of play before he would be worth anything at all to a college team. As a matter of fact it was not until his junior year that he began to win a regular place on the college team. In swimming, too, when one contrasts the methods and technique used by an untrained individual with a person who has been taught the proper techniques of swimming one again can see how widespread are the poor methods in general use.

## 2. THE NEED FOR AN INTELLIGENT PROGRAM OF DIAGNOSTIC TEACHING AND REMEDIAL WORK

As pointed out above, all teachers probably at some time or other do more or less diagnosing and remedial work. But it is far too unsafe to trust to such hap-

hazard and uncertain methods. Too many children will go so far in the practice of wrong techniques that it will cost great time and effort to eradicate the poor habits thus formed. It is a truism that wrong practice should be checked as early as possible and the correct practice substituted.

The following is a case in point. Jean was nine years old and well on into the fourth grade, but she was still having very great difficulty with the hundred basic addition facts. Her teachers kept reporting monthly to the parents that Jean was making little or no progress. Moreover it was becoming apparent that Jean was developing an inferiority complex toward her number work and a rather decided distaste for the subject. It was known that Jean was well above the average pupil in brightness, that she was a fairly good reader, spelled well, and in general liked her teachers and schoolwork. At last her father suggested that the writer should look into the question of Jean's difficulties. A test covering the one hundred basic addition facts was administered. A study of the results showed that Jean had missed more than two-thirds of the combinations, but a closer inspection showed that *in every case her answer was just one too small*. In talking with Jean about her troubles she was asked among other things if she did not add by the process of counting. This at first she rather strenuously denied, stating that the teacher strictly prohibited it. However, Jean soon became confidential and confessed that in reality in many of the cases she was counting by patting her tongue against her teeth, which, of course, the teacher could not detect. She was then asked to count out loud and her method confirmed what the results of the test suggested, namely, that she did not begin her counting at the right place. For example, if she were called upon to add 8 and 5, she would proceed by saying 8, 9, 10, 11, 12, which, of course, gave her a result which was just one too small. Upon further questioning as to how she ever got started doing this, she finally turned to her father and said, "Well, daddy, don't you remember a long time ago I asked you if this was the way to do it and you said 'Uh huh.'" It was now the father's turn to confess that he had probably thoughtlessly answered her question in the affirmative without having given any consideration to the question at all. Jean was now told the correct way of adding by counting and that counting was no great sin, but was merely a slow process and that she ought to drop it as quickly as she could get the combinations memorized. Before the end of the year was reached she was doing very creditable work in arithmetic, was keeping up with her classmates, had overcome her inferiority complex, and had even developed some liking for the subject.

In addition to the need for a systematic study of a failing pupil's disabilities, one can see in Jean's case the desirability of talking with the pupil in order to discover the erroneous mental processes that may be in use. Probably most teachers would be surprised at the methods used by children if they could get them to "think out loud" in solving their problems, even in cases resulting in right answers. This talking with the pupil should also be an opportunity of establishing confidences and harmonious relations between teacher and pupil.

### 3. PROCEDURES IN DIAGNOSIS AND REMEDIAL WORK

The typical procedure involved in diagnostic and remedial work is somewhat as follows: first, an analysis of the specific abilities, skills, and information required for successful work in a given field; second, a study of the pupil by means

of tests, interviews, physical examination, and so on, for the purpose of discovering any of his weaknesses; third, a program of instruction for the purpose of overcoming these weaknesses; and fourth, further testing to determine when the pupil's disabilities have been sufficiently removed.

Some of the subjects in the elementary school have been analyzed but roughly into their constituent elements; for example, the Freeman Chart for Diagnosing Faults in Handwriting takes account of five different elements: uniformity of slant, uniformity of alignment, quality of line, letter formation, and spacing. In the case of certain other subjects the analysis has been quite specific and highly detailed; for example, in arithmetic the Compass Diagnostic Tests\* cover more than ninety separate items, while the arithmetic material prepared by The Classroom Teacher, Inc. lists 157 different elements.†

The most extensive work has been done in the tool subjects of the elementary school. This may be due to the fact that the aims and objectives in these subjects have been more generally agreed upon by educators than is the case in the content subjects; it may also be because the subjects lend themselves better to analyses. It is more difficult to know just what are the abilities and skills needed in the study of content subjects in order that the pupil may make suitable progress. In the field of geography the Wiedefeld-Walther Geography Test Manual‡ lists the following abilities as valuable for diagnosing pupils' weaknesses: "Ability to—

- (1) interpret meaning with relation to a specific geographical idea;
- (2) interpret meaning in the light of geography information;
- (3) differentiate statements of geographical cause and effect;
- (4) interpret what is read in the light of geography principles;
- (5) interpret meanings expressed in technical geography vocabulary;
- (6) organize given data and draw geographical conclusions;
- (7) interpret meanings by visualizing geographical detail."

Under map and graph reading this test also lists the following abilities:

- "1. Recognition of symbols
2. Recognition of direction
3. Estimation of area
4. Estimation of distances
5. Location by longitude and latitude
6. Estimation of slope of land and altitude
7. Fact finding from isohyets and isotherms
8. Picturing from map symbols
9. Orientation of maps
10. Reading relations through comparative use of maps."

Instead of testing the basic abilities and skills that are fundamental in these fields, our tests of content subjects too often merely reveal gaps in the pupil's grasp of the information which it is deemed desirable for him to possess. Anderson § has

\* Harry A. Greene and Albert N. Jorgensen, *The Use and Interpretation of Elementary School Tests*, pp. 288-291.

† *A Guide to the Diagnostic and Remedial Teaching Unit*. Chicago: The Classroom Teacher, Inc., 1936.

‡ M. Theresa Wiedefeld and E. Curt Walther, *The Wiedefeld-Walther Geography Test*. Yonkers: World Book Company, 1931.

§ Howard R. Anderson, "Testing Basic Skills in the Social Studies," *Elementary School Journal*, 36, 1936, 424-35.

pointed out the need for diagnostic examinations that will test the basic skills and abilities needed in the field of history and has listed certain of these as follows:

1. The ability to read maps
2. The ability to read graphs
3. The ability to alphabetize and use indexes
4. The ability to use basic references such as an atlas, dictionary, encyclopedia, *Who's Who*, and yearbooks.

It should be kept in mind that the processes involved in diagnostic and remedial work apply to pupils individually rather than en masse. The purpose is to find out the particular disabilities of a particular pupil and then present the remedial work that this particular pupil needs in order to remedy his weaknesses. Even if, as a result of paper tests, two or more pupils appear to have about the same disabilities, it is well to remember that their psychological processes underlying these disabilities may be quite different. Two pupils may reveal the same weakness in division of whole numbers and yet each may arrive at his wrong answer by an entirely different psychological process. The techniques used in the Buswell-John Diagnostic Tests for Fundamental Processes in Arithmetic emphasize the importance of the psychological factors. The teacher needs to take careful note of individual differences in her diagnostic and remedial work.

The vocabulary or terminology peculiar to a given subject is always a very important item in the pupil's learning. The geography text may present the term "high latitudes" and the pupil may think "high altitudes." The term "humid" may be perfectly commonplace to the geographer and practically without meaning to the pupil. Such terms as strike benefits, strikebreaker, scab, picketing, sabotage may all appear in the same paragraph and with a specific meaning which must be made clear to the pupil if he is to get any real understanding from his reading. Quite a little work has been done by way of compiling lists of words peculiar to certain subjects as, for example, the terms used in the social sciences.\*

It is never safe for the teacher to go on the assumption that the pupil grasps the meaning of the terminology of his text, even though he may use this terminology with a certain degree of glibness. Almost every lesson, especially in the content subjects, should involve some checking for understanding of the vocabulary in which the thought is expressed. Excellent methods for such checking are well presented in *Reading for Understanding*.†

## II. Reading

### 1. A NON-READER LEARNS TO READ<sup>2</sup>

Clarence R. Stone

*Case history.*—George, seven years and nine months old, was clearly a nonreader at the end of two years in the first and second grades. His case

\* Truman L. Kelley and A. C. Krey, *Tests and Measurements in the Social Sciences*. New York: Charles Scribner's Sons, 1934, pp. 502-609.

† Mabel A. Bessey and Isabelle P. Coffin, *Reading for Understanding*. New York: D. Appleton-Century Company, Inc., 1936.

<sup>2</sup> From Clarence R. Stone, "A Non-reader Learns to Read." *Elementary School Journal*, 30, 1929, pp. 142-146.

was reported to the writer in July, 1928, by his teacher, a student in a class of the writer's at the University of California.

The school record showed George's intelligence quotient to be 87. He entered the first grade from the kindergarten at the age of five years and eight months. After a semester in Grade IB, he was promoted to Grade IA, but at the end of two weeks he was demoted. After repeating Grade IB, he spent a half-year in Grade IA and a half-year in Grade IIB. His promotion to Grade IIA was in doubt.

The teacher reported that George was very self-conscious and subject to tantrums and that he had been a serious disciplinary problem. She reported that he did good work in arithmetic.

The mother reported that the boy had liked his kindergarten teacher but had not liked his first-grade teacher. She said that he had a speech impediment which had interfered with his learning to read but that he had overcome it. The writer discovered, however, that he had not entirely overcome the speech impediment. The mother had merely become accustomed to it. In the opinion of the writer, the speech impediment was not one of the main causes of the boy's failure to learn to read.

George was practically unable to score in any of the simplest primary reading tests. Observations of his reactions in these tests and in his attempts to read the simplest primer material revealed that he had acquired the habit of phenomenal guessing and had developed no ability to perceive likenesses and differences in words.

*Results of expert individual instruction.*—The parents employed the writer to direct the reading instruction of the boy, and arrangements were made for him to remain out of school for the first half of the school year 1928-29. He was given from thirty to forty minutes of individual instruction daily during a period of five and one-half months. Table XIX presents the results as shown by tests.

TABLE XIX

GRADE SCORES ON READING TESTS MADE BY GEORGE IN JULY, NOVEMBER, AND JANUARY \*

	July 1928	November 1928	January 1929
Gates Primary Reading Tests:			
Type 1 (Word Recognition)	1.2	2.3	3.2
Type 1 (Word, Phrase, and Sentence Reading)		1.9	3.0
Type 3 (Reading of Directions)			2.4
Gates Graded Word Pronunciation Test	1.0	1.4	
Gray Standardized Oral Reading Paragraphs	1.0		1.7

\* A score of 1.0 means the lowest point in the first grade or 0 in reading.

George entered a different school at the beginning of the second semester and was placed in Grade IIA. At the end of the first ten weeks his report card read: "Satisfactory—Reading continues to improve." George was contented, justly proud, and happy. He was no longer a disciplinary case.

*Reasons for George's failure.*—In the opinion of the writer, George had failed in Grade IB mainly because he was mentally immature, having a chron-

ological age of only five years and eight months and a mental age of approximately five years. He probably had also a special disability in remembering visual images of words. With a slight impediment in his speech and a dislike for his teacher in addition to these two serious handicaps, it is not surprising that George failed, developed into a disciplinary case, and was reported by his teacher as being self-conscious.

*Methods and materials used.*—The two main problems in the early stages of teaching George to read were (1) to find simple easy content which he would desire to be able to read and (2) to develop an ability to perceive the characteristics of words and remember their visual images. For some time great difficulty was experienced in the case of the second problem, and it never ceased to be a problem. The selection of the *Child-Story Primer* proved to be wise. The illustrations and the content aroused the boy's interest. The dog Terry was an especially strong interest factor. Throughout the instruction careful attention was given to providing strong motives for learning to read. Interesting material and the satisfaction of success were the chief reliance in this connection.

Many special typewritten exercises in great primer type were used to develop word recognition. From the beginning George was taught to write from memory the words used in the reading. Often he spelled the words aloud as he wrote them. His father had taught him the letters a few months before his case was referred to the writer, but the boy had considerable difficulty in learning to distinguish such similar letters as *d* and *b* in print. Manuscript writing was used during the first few months because of its likeness to the printed symbols. However, eventually, when given a choice, George selected the script form of writing, which he had used to some extent in school. After he was well started in reading, only the words he had difficulty in remembering were used for writing and spelling.

Daily drills and tests in word recognition in both meaningful content and in lists of words were given. Each word introduced in the reading was typewritten in great primer type on a card two by three inches in size. The cards were used for daily tests, and George took great interest in seeing the pile of mastered words grow. Various types of matching exercises were used to develop ability to perceive likenesses and differences in words. In all these exercises the boy said the word aloud as he matched it to another copy of the word. Interest in achievement in these exercises proved to be a strong motive.

At the same time great care was taken to see that a joyful experience was had each day in reading simple, meaningful selections containing a minimum of difficulties in word recognition. In addition to the *Child-Story Primer* and the accessory test and seatwork material, the workbook entitled *My Progress Book in Reading* (For Beginners) proved very helpful. The *Elson Hand Chart* and the *Elson Primer* together with the accompanying *Silent-Reading Seatwork Pad* proved valuable. *My Reading Book* by Washburne and Youngquist with the accessory material was used co-ordinately with the other materials. George became very much interested in making perfect scores in the workbook and test exercises involving meaningful reading.

At the opening of school in the autumn the boy was recommended as prepared to do satisfactory silent reading at a high-second-grade level. It was suggested that oral reading be kept to a minimum for this boy in order to avoid his reverting to his previous habits which were inhibiting progress.

### III. Arithmetic

#### A REMEDIAL CASE IN ARITHMETIC<sup>4</sup>

*M. S. Trousdale*

Case 3, designated in this report as R. H., was a pupil in the Peabody Demonstration School. At the time this study was made he was ten years and six months old and was in the fourth grade.

#### EXTENT OF THE STUDY IN TIME

This study, a report of which follows, was conducted during the period from April 10 to May 21, 1929. R. H. was taught five days each week for a period of approximately thirty minutes per day.

#### INITIAL STATUS

In order to secure a measure of R. H.'s initial ability in arithmetic he was tested with the Pittsburgh Arithmetic Scale, Form A. Before beginning the test, R. H. was asked in which arithmetic operations he believed he was having the most difficulty. He promptly replied, "I have the hardest time with subtraction and multiplication." A check of his work on the test seemed to verify his belief, as the following table shows:

TABLE XX

ANALYSIS OF RESULTS, INITIAL TEST, PITTSBURGH ARITHMETIC SCALE, FORM A

<i>Process</i>	<i>No. Attempted</i>	<i>No. Correct</i>
Addition . . . . .	7	5
Subtraction . . . . .	7	2
Multiplication . . . . .	6	0
Division . . . . .	6	4
Total . . . . .	26	11

R. H. made a score of 11 correct out of a possible 40 on the test. His arithmetic age according to the test norms was seven and a half years, and he was therefore approximately one grade retarded. The results of this test revealed the places of his weakness but gave no indication as to the cause of his weakness.

#### DIAGNOSIS

*Sources.*—The following sources were used in securing diagnostic data for Case 3: (1) School records, (2) opinions of teachers, (3) observation of

<sup>4</sup>From Mattie S. Trousdale, "Remedial Cases in Arithmetic," *Peabody Journal of Education*, 7, 1930, pp. 290-298.

pupil's behavior, (4) informal tests, and (5) the Buswell-John Diagnostic Chart. Below is a more or less detailed account of the data procured.

*Detailed Data: School records.*—No records were available earlier than the fall of 1928 at which time R. H. entered the Peabody Demonstration School from the Nashville city schools. After a trial he was found to be unprepared for the work of grade four and was placed in grade three. His I.Q. according to the Detroit Intelligence Test administered in May, 1929, was 86.\* Standardized achievement test scores showed him to be below average in other school subjects as well as in arithmetic.

His health chart showed no physical defects, and his conduct and his habits had been such as to rank him as a "standard" child for each of the two years in which records were available. He was interested in boys' sports and was especially fond of baseball. In the latter game he was sufficiently skilled to be made pitcher of his team.

*Teachers' opinions.*—The boy's teachers in both the third and the fourth grades considered him a very slow learner. However, the fact that he was forced in his school to compete with children who on the average have I.Q.'s ten or fifteen points above 100 was undoubtedly at least partly responsible for his comparatively low intelligence rating. He was obedient and gave no trouble from the standpoint of discipline. He had the reputation of putting his best effort into his work.

*Observations of behavior.*—The writer found R. H. to be a quiet, unassuming, and rather reserved child. He seemed to be somewhat indifferent and took the work assigned as a matter of course. However, when challenged by another pupil to compete on an addition test, he showed an eagerness to excel and swelled with pride when he surpassed his opponent. He was usually prompt at class and attended to what he was given to do.

*Informal tests.*—Informal typewritten tests in arithmetic were given as often as once each week. These tests served as checks upon the preceding lessons and assisted in locating difficulties which had not been removed or otherwise detected.

*The Buswell-John Diagnostic Chart.*—On April 11 work was begun with the example of the Buswell-John Diagnostic Chart for Individual Difficulties in the Fundamental Processes. Before this test was administered R. H. was directed to "think out loud." In this way, he was told, his teacher could write down on her chart exactly what he said and might find the causes of his difficulties and be in a better position to give help. The test was completed in two periods of about 45 and 55 minutes. The difficulties were then tabulated according to the "habits" listed on the diagnostic chart. They are summarized below in Table XXI.

The reader will note that while R. H. had a greater number of types of ineffective habits in addition (seven) than in any of the other operations, the most frequently used ineffective habits were in subtraction (forty-two) and multiplication (thirty).

\* His I.Q. obtained in October, 1929, by means of the Stanford Revision of the Binet tests was 101. (W.A.B.)



TABLE XXI

TYPES AND FREQUENCIES OF INEFFECTIVE HABITS EMPLOYED BY R. H. IN THE  
FUNDAMENTAL OPERATIONS

<i>Operation</i>	<i>Habit</i>	<i>Frequency</i>
Addition	a 1 Errors in combinations	14
	a 4 Forgot to add carried number	1
	a 9 Carried wrong number	1
	a 11 Split numbers into parts	2
	a 19 Derived unknown combination from familiar one	2
	a 23 Carrying when there was nothing to carry	1
	*Mixed process in same example	1
	Total	22
Subtraction	s 1 Errors in combinations	15
	s 6 Subtracted minuend from subtrahend	1
	s 8 Added instead of subtracting	1
	s 21 Confused processes with division	25
	Total	42
Multiplication	m 1 Errors in combination	4
	m 7 Used multiplicand as multiplier	1
	m 15 Errors due to zero in multiplicand	1
	*Confused processes with division	24
	Total	30
Division	d 1 Errors in division combinations	1
	d 6 Neglected to use remainder in the problem	3
	d 7 Omitted zero resulting from another digit	2
	d 15 Omitted final remainder	2
	Total	8

\* Not listed by Buswell and John as common "habits."

A careful examination of the notes entered by the writer on her chart revealed surprising conditions. Only the most striking of these will be illustrated in this paper.

- In the first place, of the forty examples attempted in subtraction, only
- (1) 15 sixteen had correct answers and of these, twelve had been derived  
4 through faulty mental processes. Thus, in the first example at the  
11 left, R. H. secured eleven for his answer by saying, "four, take  
away five are one; one, take away nothing is one." His processes
  - (2) 79 in the second example to the left were, "Four, subtract nine, leaves  
24 five; two from seven leaves five." More astonishing was his procedure  
55 in connection with the third example when he said, "Three  
into four goes one; nine into two won't go. Nine into twelve goes
  - (3) 624 three; five into one goes four." In the fourth example he said, "Five  
193 from nine goes four times; four from eight goes four times; nothing  
431 from one goes one time."

- (4) 189 The illustrations cited are particularly interesting for the reason  
45 that, as has been said, the answers, though arrived at by remark-  
144 ably confused thought processes, were correct in each instance.
- Such intimate details\* of this boy's procedures, to be had only through direct contact with the individual pupil, constitute a real diagnosis of his disability in arithmetic. His ineffective procedures did not always yield correct answers, however. When dealing with zero in the two following
- (5) 950 examples, he found an obstacle which he could not surmount.  
376 In the first example at the left he said, "Six into naught won't go;  
580 seven into five won't go; seven into fifteen goes eight; two into eight goes five;" and in the sixth, he said, "Two into six goes three
- (6) 836 times; nothing into three goes no times; three into eight goes  
302 five times."
- 503 In the second place, R. H. employed in multiplication procedures which were equally as confused as those illustrated in subtraction. Furthermore, his multiplication processes bore marked resemblance to his subtraction processes. The first four examples in the Buswell-John multiplication test are simple combinations of the type  $2 \times 4$ . The first three of
- (1) 241 these R. H. worked correctly, making use of the usual method,  
5 thus, "Two times four are eight." From that point on, however,  
1205 he confused multiplication with other operations. Of the twenty-nine multiplication examples which he attempted, twenty answers
- (2) 102 were correct, but seventeen of these twenty were arrived at through  
9 faulty procedures. "Into," was used instead of "times" in practically every instance. For instance, in the first example at the left,  
918 R. H. said, "Five into one is five; five into four is twenty; carry
- (3) 0 two; five into two is ten, and two is twelve." In the second example at the left he said, "Nine into two is eighteen; nine into  
5 naught is one; nine into one is nine." As in the case of subtraction the presence of zero in multiplication examples complicated
- (4) 0 the situation considerably. His processes with the two examples  
6 listed were, "Five into naught is five" and "Six into naught is  
6 six."

R. H.'s difficulties in addition and in division were not uncommon and need little more than passing comment. In addition the greatest number of his errors was made when he was required to add a digit to a two-digit number, as in  $22 + 6$  and  $15 + 9$ . His answers for these additions were respectively thirty-one and twenty-seven. He could not tell how he combined these numbers except to say that he "guessed." Of his fourteen errors in addition twelve were of the type indicated. The other two errors occurred when he dealt with simple addition combinations.

\* Such diagnostic data cannot in the nature of things be secured through group tests or through the analysis of children's written work. Nothing on the boy's paper revealed his methods of securing his answers, and the latter, being correct, would be accepted as convincing evidence that he had little difficulty in subtraction. (W.A.B.)

R. H. made the fewest number of mistakes in division, a condition which may have been attributable to the fact that he had received very little instruction in this operation. Only short division was attempted, and the examples in this subject were correctly computed except when zero was involved.

#### REMEDIAL INSTRUCTION

*Subtraction.*—With the tabulation of R. H.'s methods of work completed and his difficulties located, it seemed wise to begin remedial instruction with the ineffective habit which appeared most frequently. The summary in Table 2 above shows that subtraction was confused with division twenty-five times. In these cases R. H. regularly thought "goes into" and "won't go" instead of "from." The first lessons had as their primary objective to make clear the meaning of "subtract." Cards with dots arranged in groups were prepared. A card was shown to R. H. On it he was asked to identify the groups of dots and their sum. The card was then folded so that one group was "taken away"; R. H. then named the number remaining. This was repeated with a number of cards, and each time R. H. was told that taking away dots meant subtracting. The word "subtract" was written on the blackboard, the meaning explained and associated with the process, not only with the answers derived from the use of the cards, but also with examples based on such objects as were in the room. R. H. asked to work on the blackboard and a good many examples were done in this way, the meaning of subtract being asked for over and over. He learned "take away" and "from" and regularly used these terms aloud. A page of subtraction examples was then worked in the notebook in which the lessons were kept. In all his work R. H. was required to do his thinking aloud.

The second lesson began with a review of the meaning of subtract. The examples used were similar to those in the Buswell-John test, a new step of difficulty being introduced as the previous step seemed to have been mastered. Once the meaning of subtraction was clear to him, R. H. made rapid progress. Lesson four consisted of all the subtraction facts. Very little trouble was met, the combination  $11-2$  proving to be an important exception. There followed twenty-eight examples in subtracting numbers of three and four digits each. The computation was done aloud and the old habit of thinking "into" and "goes" was carefully guarded against. Lesson five was devoted to twenty-five examples in subtraction involving five digit numbers and zeros. No lapse into the old errors was noted.

When R. H. found some difficulty with a subtraction combination, such as  $14-6$ , the writer endeavored to give him a way of thinking about the numbers so that he might discover the answer for himself. He was asked, "How many are seven and seven?" "Now if you take seven from fourteen, how many are left?" "Then how many are left when six are taken from fourteen?" This general method proved to be very effective.

Up to this time R. H. had had no homework. At the close of lesson five

he asked for such work. He was told why he had been given none, namely, to prevent wrong practice. He agreed it was best to wait awhile longer, as he was anxious to make improvement.

*Addition.*—R. H. made his greatest number of mistakes in addition in adding a column of two-digit numbers or adding a one-digit number to tens. Lessons were planned for the purpose of teaching him how to span numbers. The following will illustrate the general method of giving him help. Suppose that he had missed  $38 + 6$ . He knew six and six make twelve. From that he discovered that six and eight are fourteen, and then that thirty-eight and six are forty-four because eight and six is made up of a ten and a four so that the right-hand number must be four and the ten must be added to the thirty. A good many examples in column addition which comprised one-, two-, and three-digit numbers were given.

Homework was now allowed because R. H. had not had so much trouble with addition. A page of typed examples, forty-five in number, was given, and he was asked to do the work without help. He made only one error and in this example he failed to carry. The assignment of homework consisted of ten examples of eight single digits each, eight of five two-digit figures, and seven of four three-digit figures. This lesson proved to be too difficult, for he missed nine examples. The boy said that he had been bothered by too much talking at home while he tried to work.

On April 22 an addition test was given as a result of a challenge from another pupil. R. H. worked seventy-two out of seventy-five simple combinations in two and one-half minutes. The combination  $4 + 9$  was the occasion of the two errors made. The next lesson was a review of subtraction, the work being done audibly. No confusion of terms was observed.

*Multiplication.*—The reader will note that, according to Table 2, R. H.'s second greatest source of difficulty was his confusion of the meaning of terms in multiplication. "Into" was used for "times" twenty-four times according to the summary. The first remedial lessons were with objects, counting groups a number of *times* until the meaning of multiplication seemed clear. No unusual technique was used to develop the idea. After the meaning was apparently clear, examples with one digit as a multiplier were used, those involving the simpler combinations coming first. R. H. then asked for more difficult examples, and the next lessons included two- and three-digit multipliers.

Lesson twelve consisted of a test composed of examples in addition, subtraction, and multiplication. In addition, two errors were made out of fourteen chances. No trouble was apparent in subtraction. Some assistance was given in the long examples in multiplication which were confusing because the multipliers were longer than the multiplicands. A timed test in subtraction closed the week's work. Twenty-three examples were correctly worked in two minutes. Among these examples were  $17 - 14$ ;  $429 - 263$ ;  $702 - 192$ .

*Division.*—Long division was begun without spending any time on short division as the preliminary tests had revealed little difficulty at this point. The

short division form was used, and the subject of long division was introduced with a one-digit divisor. The new work of course involved the operations of multiplication and subtraction in which special instruction had just been given. The fact that these operations appeared now in a new setting seemed in two instances to confuse R. H., as was shown by his reversion to the old habit of saying "into" and "goes" when multiplying and subtracting. Five lessons of approximately thirty minutes each were given to examples of one- and two-digit divisors. Not sufficient practice was supplied to fix the process, however, because of time limitations, but R. H. was eager to return to his group and to match his skill with that of his classmates.

## EVIDENCES OF IMPROVEMENT

*Objective evidence.*—(1) After the remedial instruction had been completed, R. H. was given Form A of the Pittsburgh Arithmetic Scale for the second time. His scores on this second trial were: Addition five, subtraction five, multiplication seven, division five. A comparison of the results of the first and the second application of the test is furnished by Table XXII.

TABLE XXII

COMPARISON OF RESULTS WITH THE PITTSBURGH ARITHMETIC SCALE BEFORE AND AFTER  
REMEDIAL INSTRUCTION

	Number Attempted			Number Correct		
	Initial	End	Gain	Initial	End	Gain
Addition . . .	7	7	0	5	5	0
Subtraction . . .	7	7	0	2	5	3
Multiplication . . .	6	7	1	0	7	7
Division . . .	6	8	2	4	5	1
Total . . . . .	26	29	3	11	22	11

It is apparent in Table XXII that R. H. gained far more in accuracy than he did in speed and that his greatest improvement was made in the two operations (subtraction and multiplication) which had caused the greatest difficulty in the first test. It was of course on these two operations that the greatest part of the remedial instruction was focused. As measured by the test norms, R. H. raised his arithmetic age from seven and a half to ten years. In terms of grade norms his improvement in the six weeks of special instruction was equivalent to a change from the 3B level to the 4B level.

That the crude scores as above presented rather undervalue the amount of gain than exaggerate it is clearly evident from a comparison of R. H.'s test papers themselves. In the first test he made no attempt at all to solve the examples  $63 \overline{)5607}$  and  $37 \overline{)3197}$ . After remedial instruction he solved the second of these examples correctly. In the first example his answer was eighty-eight instead of eighty-nine; the remainder from the second division was equal to

the divisor, but he failed to recognize in this situation the need of nine instead of eight as the multiplier. Improvement over his initial ability is clearly shown by his second performance even though it is not indicated by an increase in score.

(2) The Buswell-John Diagnostic Chart was then used a second time, R. H. reporting his processes as he had done the first time. Table XXIII contains evidence of marked improvement in his methods of thinking about the various operations.

TABLE XXIII

COMPARISON OF RESULTS WITH THE BUSWELL-JOHN DIAGNOSTIC CHART BEFORE AND AFTER REMEDIAL INSTRUCTION

Operation	Ineffective Habit	Frequency	
		Initial	End
Addition	Errors in combinations	14	1
Subtraction	Confused operation with division	25	0
Multiplication	Confused operation with division	24	0
Division	Failed to carry second test far enough to make comparison		

Table XXIV is a more detailed method of showing the changes brought about by the remedial instruction in R. H.'s methods of thinking of operations. His processes in dealing with the same two examples before and after remedial instruction, it will be observed, are markedly different.

TABLE XXIV

COMPARISON OF PROCESSES USED BEFORE AND AFTER REMEDIAL INSTRUCTION

Operation	Example	Processes	
		Before	After
Subtraction	528 64 —	"4 into 8 goes 4 times; 6 into 12 goes 6 times; 4 into nothing goes 4 times"	"4 from 8 is 4; 6 from 12 is 6; 4 from 4 is 0"
Multiplication	241 5 —	"5 into 1 is 5; 5 into 4 is 20; 5 into 2 is 10; and 2 is 12"	"5 ones are 5; 5 fours are 20; carry 2; 5 twos are 10 and 2 are 12"

*Subjective evidence.*—Other evidences of improvement, subjective in nature, may be summarized briefly:

- (1) When working long division after remedial instruction, R. H. remarked: "These are easy now."
- (2) When he was told that he could return to his grade and work with the other children for the few days remaining before the end of the term, he

said: "I'm as good as a lot of others in my room now, and I won't get mixed up any more."

- (3) His regular teacher testified to a distinct increase in his confidence in his own ability.

#### IV. English

##### THE INTERVIEW AS A TECHNIQUE FOR DISCOVERING CAUSES OF ERRORS<sup>5</sup>

S. L. Pressey and P. Campbell

After a preliminary trial to work out the technique and develop rapport with the children, six different pieces of written work were selected for intensive study: an incident from *Treasure Island*, a book report, a topic based on *The Merchant of Venice*, a letter, an examination on some thirty previously memorized lines of poetry, and a piece of expository writing written from an outline. As soon as each set of compositions was handed in it was corrected; there was then an interview with each pupil in which he was shown each error and asked why he made it.

The first, rather unexpected point is that the errors in capitalization were in large part explainable, logical, and understandable; they were far from being random or senseless. For instance, one child capitalized "Island," when used by itself, throughout her paper on *Treasure Island*, because she thought of the word as referring to a particular spot—not just any island. Another child capitalized all the words of a title in his book report because he said that in the actual book they not only began with capitals, but consisted entirely of capitals; in transcribing the title to his own theme he thought he should at least keep the initial capitals of each word. Another child was writing about happenings at some school and began the word "school" with a capital. His explanation was that, although the events apparently took place elsewhere, they really occurred in his own school and he was in the habit of writing the name of his school with capitals. Another child used the words "God Bless you" and reasoned that since "God" was capitalized and "Bless" went with "God" it, too, should be begun with a capital. Another child began "Pirates" always with a capital on the grounds that these were real people, just as real as "John Silver" or "Captain Kidd." Several children capitalized words they wanted to have stand out, thinking such words would gain greater emphasis; for example, "These were Blood Curdling events"; "I was a Freshman in High School at the time"; "A little earlier the Christian People persecuted the Jews." The writer of this last sentence further justified his capitals by saying that as "Jews" were a particular group of persons, so were "Christian People."

The failure to capitalize the first word in a line of poetry was due almost wholly to a following of the sense rather than the form. For instance, the lines

So let it be with Caesar. The noble Brutus  
Hath told you Caesar was ambitious

<sup>5</sup> From S. L. Pressey and P. Campbell, "The Causes of Children's Errors in Capitalization," *English Journal*, 22, 1933, pp. 197-201.

usually appeared as

So let it be with Caesar.

The noble Brutus hath told you that Caesar was ambitious.

There were many cases of perseverance in the capitalization of common nouns in the title when those words appeared in the body of the writing. Thus, if a title were "The Arrow and the Song," the words "arrow" and "song" both tended to be capitalized whenever repeated. On the other hand, many children who could state the rules about the use of capitals in a title failed to use capitals because they regarded the title as a sort of first sentence to the story, and hence capitalized only the first word and actual names of persons or places. The error here was obviously due to a failure to grasp the nature and function of a title. In the classes of ninth-grade children used as subjects in this investigation there were a few children who omitted capitals because they were not sure how the needed letter was formed, or else made such letters only with difficulty; there was also one girl who persistently used capitals because they looked so pretty and she liked to make them.

The actual errors found on all six pieces of writing are classified in Table XXV.

TABLE XXV  
SHOWING TOTAL ERRORS IN THE USE OF CAPITALS

	<i>Failure to Capitalize</i>	<i>Capital Where Not Needed</i>
Important words of title	47	10
Person's title used in place of name	14	
First word of sentence *	63	
Title preceding name	3	
Salutation		3
Complimentary close	1	2
Words referring to deity	4	3
Specific common nouns capitalized		46
Name of organization	1	..
Direct quotation	7	
Adjective derived from proper noun	3	
Name of place	2	..
First word of line of poetry	25	..
Total	170	64
	234	

\* Most of these errors are due to failures in sentence structure; when the children realized they were beginning a new sentence there seemed to be no trouble.

Of the 234 errors noted, 57 (24 per cent) had to do with the titles of themes, 63 (27 per cent) were made because the children did not sense where a new sentence started, 46 (20 per cent) came from the using of a common noun as a proper noun, and 25 (11 per cent) were failures to capitalize the beginning of a line of poetry. The remaining 18 per cent of errors are scattered over a



number of usages. As far as the actual problems of capitalization are concerned, two problems—the handling of the title and the use of common for proper nouns—are outstanding.

*Discussion.*—Again it should be pointed out that these are not errors purely of carelessness, nor are they entirely illogical. They are mistakes in the way children think about the use and significance of capitals. Their queries into what seem to them unusual usages might run as follows:

If an important word in a title is capitalized, why not an important word elsewhere?

If God is capitalized, why not the things God does?

If the writer is thinking of a particular street, island, river, or town, why shouldn't he capitalize it even though its actual name does not appear?

If names of certain groups of people, such as Puritans, Jews, Republicans, are capitalized, why not the names of other groups, such as Pirates, Lawyers, Companions?

If one commonly begins the first word of a sentence with a capital, why should one introduce more capitals into the middle of a sentence merely because a new line of poetry is begun?

When a title comes as the first thing in a story, why isn't it the first sentence?

It will be seen that errors center about certain usages where a word may be capitalized in one situation but not in another. Some pupils seem not clear in their thinking about such situations; explanation of the logic of the differentiation was the natural remedial method. However, the issues were in some cases such as to bring out very clearly the arbitrariness of certain practices, and the desirability of changing them. Thus general adoption of the library practice of capitalizing only the first word of the title of a book or article would at one stroke eliminate one common source of confusion. But whatever one's stand on such questions, it can surely be agreed that such an individual, intimate inquiry into children's mental processes in writing is highly illuminating.

*Summary.*—(1) The paper reports an intensive study, in two ninth-grade classes, of the causes of error in capitalization; each child was interviewed individually and an attempt made to get him to "think out loud" as to just what his reasons were in each instance where he made an error.

(2) Most errors were found not simply due to "carelessness" or "chance"; in most cases the child had reasons for his error—sometimes his error was more logical than the "correct" usage.

(3) It is urged that such an approach can be of great value in improving methods of instruction, and should be considered also in decisions as to what should be called "correct."

V. Remedial Work in Spelling<sup>6</sup>

## DIAGNOSTIC AND REMEDIAL PROCEDURES PRACTICED BY THE TEACHER

*Hazel Prehm*I. METHODS OF GAINING INFORMATION RELATIVE TO PROBABLE  
TYPES OF DIFFICULTY

The first few weeks of school the teacher endeavored to determine the probable individual obstacles to correct spelling in the group which she was teaching. Such information was secured from four sources: (a) the report of the school nurse, (b) the personal talks with pupils, (c) the close supervision of the spelling study periods, and (d) the composite tabulation of the individual errors from the spelling tablets. Many of the types of difficulty which are reported in the summary below are similar to those described in Miss Davis's study.

A. *Reported by school nurse*

- (1) Defective hearing (two cases)
- (2) Defective speech (1 case)

B. *Discovered through personal talks*

- (1) Discouraged because of consistent spelling failure in previous years (1 case)
- (2) Discouraged because of high number of Monday misspellings (2 cases)
- (3) Handicapped because attempted to spell many words as they sounded to him (1 case)
- (4) Appeared to lack interest (1 case)

C. *Discovered through supervision of study periods*

- (1) Had not mastered steps in learning to spell
- (2) Did not pronounce words correctly
- (3) Did not associate sounds of letters or syllables with spelling of word
- (4) Failed to check own errors
- (5) Copied word incorrectly for study
- (6) Wrote illegibly
- (7) Failed to use time to good advantage

D. *Determined from the composite tabulations of individual errors from the spelling tablets*

- (1) Ignorance of how to spell the word
  - (a) Misspelled grossly
  - (b) Omitted one letter
  - (c) Omitted final *e*
  - (d) Inserted one letter
  - (e) Added final *e*
  - (f) Substituted one letter
  - (g) Substituted final *t* for *ed*

<sup>6</sup> From Hazel Prehm, "A Year's Growth in the Spelling Ability of the Fourth Grade Pupils of the University Elementary School for the Year 1928-1929." (An unpublished master's thesis, State University of Iowa, Iowa City, Iowa.)

\* Georgia Davis, "Remedial Work in Spelling." *Elementary School Journal*, April, 1927, pp. 615-626.

- (h) Interchanged letters
- (i) Doubled the wrong letter in a word
- (j) Failed to double a letter
- (k) Failed to drop *e* before *ing*
- (l) Spelled word as it sounded to him
- (2) Capitalization and punctuation
  - (a) Failed to use a capital
  - (b) Used capital unnecessarily
  - (c) Omitted hyphen
  - (d) Used hyphen unnecessarily
  - (e) Failed to observe an abbreviation
  - (f) Omitted period after abbreviation
  - (g) Omitted apostrophe in a possessive
  - (h) Used apostrophe unnecessarily
  - (i) Omitted apostrophe in a contraction
  - (j) Misplaced apostrophe in a contraction
- (3) Wrote the wrong word
  - (a) Substituted a word similar in sound
  - (b) Substituted a word foreign to the one pronounced
  - (c) Made a homonym error as, *many* for *merry*
- (4) Evidenced pupil mispronunciation
- (5) Failed to separate a two-word form as, *all right*
- (6) Failed to write a word or words
- (7) Wrote illegibly
- (8) Erased to correct an error
- (9) Started wrong, rewrote correctly
- (10) Started wrong, rewrote incorrectly
- (11) Started wrong, failed to complete word
- (12) Started right, failed to complete word
- (13) Retraced letters to correct error
- (14) Formed letters faultily

## 2. PROCEDURES USED TO REMEDY TYPES OF DIFFICULTY DISCOVERED

### A. *Physical defects*

Two children (a boy and a girl) were reported by the nurse as having serious cases of defective hearing. These children were moved to seats near the front of the room.

The child with the defective speech was given speech correction work through the university speech clinic. However, at the outset the child rated superior scores in spelling. Apparently his speech defect did not hamper his spelling ability.

### B. *Undesirable mental set*

Four types of difficulty involving mental set were discovered through personal talks. A detailed report of the four cases involved will be found at the close of this chapter under *Case Studies*.

### C and D.

Items of method in regard to the supervision of the study period and the use of the tabulations of individual types of error from daily spelling tests.

(1) The teacher spent from ten to twenty minutes each Monday and Wednesday in checking the spelling tests to determine the individual types of error. As she checked through the tablets she wrote on a card the names of pupils whom she would help the next day, and she indicated beside each name the type of error to be corrected. This specific information previous to the Tuesday and Thursday study period enabled the teacher to proceed more rapidly and efficiently in helping those pupils whose spelling errors had indicated the need for a definite type of help. Samples of the teacher's diagnostic sheets for two study periods will follow. The teacher had, of course, briefer notes than are included here for the reader.

### 3. TEACHERS DIAGNOSTIC SHEET FOR LESSON SIX USED FOR THE TUESDAY STUDY PERIOD, OCTOBER 23, 1928

The procedure for the period was as follows:

- A. Pronounce the Monday list of words aloud as a class exercise
- B. Announce general difficulties to the class.
  - 1. A rather general letter formation difficulty was writing the word *friend* with two *e*'s and dotting the first *e*, but calling the letter *i*, as *frënd*.
  - 2. Homonym difficulties: *seam* (seem), *marry* (merry). Have words used again in sentences.
  - 3. Word *enough* missed by over half the class. Evidently a hard word to be mastered.
  - 4. Too frequent retracing of letters.
- C. Special help
  - Pupil 6—Failed to write five words, why? Talk it over.
  - Pupil 7—Still writes too small (hold pencil more firmly), retracing letters, re-pronounce words with him. Big "clean-up" job—give encouragement.
  - Pupil 10—Continued omission of letters—especially letter *e*. Stress observing letter placement in syllables of word.
  - Pupil 11—Gross misspelling, tries to spell by sound. Have her pronounce her misspelled words after me. Encourage her.
  - Pupil 12—Why so frequent retracing of letters? Talk it over.
  - Pupil 13—Spells by sound *bace* (base). Help on *enoth* (enough), *fale* (fail), *marry* (merry).
  - Pupil 15—Illegibility, too many letters retraced for clearness. Sharpen pencil.
  - Pupil 17—Not writing word asked for, listen more attentively to sentences—wrote *afraid* (friend), *failed* (fail).

### 4. THURSDAY'S STUDY PERIOD OCTOBER 25, 1928

- A. General class difficulty continues to be retracing either to correct misspelling or to correct faulty letter formation
- B. Special help
  - Pupil 6—Too much retracing, pencil needs sharpening.
  - Pupil 7—Writing over; wrote capital *M* in *march*. Why? Explain to him. Big job, encouragement. Practice close observance of letter placement.
  - Pupil 8—Frequent writing over of letters, capital *M* in *march*. Why?

Pupil 10—*Seam* (seem) still omits letters as in *smaler*, *blam*.

Pupil 11—Stress syllables in word *tick-et*, *a-part*; also sound of letters in the pronunciation for words as *n* in *branch* (brach), *l* in *helps* (hleps) *a* in *apart* (aport), *sh* in *brush* (bruch).

Pupil 13—Spells by sound *ceem* (seem), *cake* (sake). Talk this over with him.

Pupil 16—Two cases of retracing to correct. Not sure enough. Study words twice today.

Pupil 17—Still doesn't listen attentively for sentences and repeating of word before beginning to write. Wrote *new* for *rooms*, *fall* for *fail*, writes over letters for clearness of formation.

(2) On study days the teacher centered her attention on the few pupils whose test results indicated a definite need for help. She also endeavored, however, to remedy any error which came to her attention as she worked with the regular class group. Much of the help which the teacher considered quite vital required but a few seconds of her time. Such things as showing a pupil how to form a given letter, calling attention to incorrect spelling due to failure to apply a point in the method of study, giving encouragement where needed, or complimenting a child for improvement on a type of difficulty of which he and the teacher were mutually conscious, all materially aided in developing a desirable spelling morale.

(3) In addition to the help given the regular class group by the teacher, from one to three capable children quite frequently assisted her on study days. They tested individually those pupils who apparently had no particular difficulties but had missed a few words. The first semester two or three of the children who were consistently good spellers, and who had spelled to a 100 per cent accuracy on the Monday and Wednesday tests were designated as helpers. The second semester the children in the accelerated spelling group frequently served as helpers. The helpers were named at the beginning of each study period. The children considered it a privilege to be chosen to assist with the individual testing on study days. Children who promoted a disturbance, or who were found to be careless in testing, were denied the privilege of being helpers again. The plan for individual testing on study days was described in detail on pages 37-38 in Chapter IV of this thesis.

(4) On Tuesday after each child had "cleaned-up" his Monday errors, the teacher requested that he test himself on his ability to use in a short written sentence each word in the review lesson [on] which he would be tested the next day. This review lesson had been a new lesson one month previously. The use of the words in sentences was simply a writing and composition exercise, not a study device. All the children did not have time to do this exercise. The papers containing the sentences were collected, and any difficulties in regard to the use of certain words were cleared up by the teacher at the beginning of the Wednesday lesson. After a child had "cleaned-up" his Monday words and used the Wednesday review words in sentences, he was free to spend the remaining time on something other than spelling. He usually had a book at his desk and spent the time reading.

(5) The teacher occasionally reported to the class at the beginning of a spelling period the most frequent types of class errors. This was done not only to acquaint the group with their difficulties but also to call to their attention more sharply that individual improvement also meant class improvement. The stenographic report which follows will illustrate this point of method and the class discussion will also show further items of method in spelling.

VI. Diagnosis of Individual Handwriting Difficulties <sup>7</sup>*Beatrice L. Lehning*

*Selecting samples of handwriting.*—In order to make the list of handwriting difficulties inclusive, six papers were obtained from each pupil. These papers were written in a variety of situations as shown below:

<i>Date of writing</i>	<i>Type of subject matter</i>	<i>Time relationship</i>	<i>Emphasis on handwriting</i>
(1) October 8	Copy of a poem, written for a composition lesson	No time pressure Used 25 minutes	None
(2) October 14	Fall writing test	Test pressure Time 3 minutes	Much
(3) October 18	Copy of a paragraph written in writing period. Children were fairly familiar with it.	Used 3 minutes	Much
(4) October 21	Copy of ten sentences containing special connecting strokes. The sentences were numbered.	Used 5 minutes	Some
(5) October 21	Original composition	No time pressure	Some
(6) October 22	Original note written in writing class. Pupils wrote as they composed.	No special time pressure. Used 15 minutes	Some

Six different writing situations are represented in the samples above. It is conceivable that these various factors might influence the number and the type of handwriting errors. The six situations follow:

- (1) Writing while copying from the blackboard
- (2) Writing while composing, not copying
- (3) Writing under time and test pressure
- (4) Writing without special time and test pressure
- (5) Writing when special emphasis is placed upon the quality of handwriting
- (6) Writing without special emphasis on handwriting

The samples numbered 2, 3 and 4 each contain all the small letters of the alphabet in different settings and several capitals including *I*, *T* and *D* which

<sup>7</sup> From Beatrice L. Lehning, "The Preparation and Testing of a Remedial Method in Handwriting," June, 1930. (An unpublished master's thesis, State University of Iowa, Iowa City, Iowa.)

were found by Pressey \* to be the capitals most frequently written by children and adults.

Number 4, the sentences, includes the figures and also several connecting strokes and combinations of letters which seem difficult for children as judged from the experience of the writer. These combinations are: *yi, ry, ow, nn, ob, lf, wr, nyo, vy, by, jn, ze, ys, ws, ye, ght*.

*Checking and tabulating errors.*—As stated . . . , the handwriting difficulties found on the pupils' papers were of two types: (1) offenses against a reasonable attractiveness of arrangement and neatness of the page, and (2) illegibilities, i.e., all forms of letters, connecting strokes and figures which interfere with easy reading by others. The first were designated as *general faults*, the second, as *specific faults*. The complete list of general and specific faults is given here.

#### GENERAL AND SPECIFIC HANDWRITING ERRORS

Grade Four	October, 1929
I. General faults	Number of Pupils †
A. Rewritings	28
B. Erasures	14
C. Blots	20
D. Uneven margins	26
E. Poor alignment	15
F. Poor quality of line	8
G. Poor movement and rhythm	25
H. Low quality (Ayres scale)	21
I. Irregular spacing	21
J. Irregular slant	19
K. Faulty speed	23
L. Incorrect position	15
II. Specific faults	
A. Poorly written letters	
1. Formation	
a. Letters unidentified	
b. Letters resembling others	
c. Curves and points confused	
d. Incorrect beginning strokes	
e. Incorrect finishing strokes	
f. Incorrect connecting strokes	
g. Unnecessary lines	
h. Letters not closed	
i. Letters closed	
j. Poor proportion	
2. Size	
a. Too short	

\* Pressey, S. L. and L. C., "Analyses of 3000 Illegibilities in Handwriting." *Educational Research Bulletin*, Vol. VI, No. 13, Sept. 28, 1927.

† Number enrolled was 28.

- b. Too tall
- c. Too narrow
- d. Too wide
- 3. Placement
  - a. Base of letters above base line
  - b. Letters "in" the line
  - c. Lower loops on the line
  - d. Lower loops too short
  - e. Lower loops too long
  - f. Upper loops too short
  - g. Upper loops too tall
- 4. Slant
  - a. Too vertical
  - b. Lower loops too slanting
- B. Poorly written figures

A check was made of the number of pupils whose handwriting showed these general faults. The figures at the right represent the number of pupils whose papers showed these faults to a marked degree.

The tabulation of specific errors or faults was done in two ways. First, all the different types of errors made in writing each letter of the alphabet and the number of times each error was found in the series of children's papers were recorded for each pupil. Poorly made figures were also noted. A card showing this tabulation of his individual errors was given to each child. A copy of the card of pupil number twenty-one is inserted here.

## MY WRITING ERRORS—SIX PAPERS

*Pupil Number Twenty-One*

I. General faults	October, 1929
A. Rewritings	16
B. Erasures	3
C. Blots	3
D. Uneven margins	7
E. Poor alignment	x
F. Poor quality of line	average
G. Poor movement and rhythm	x
H. Low quality on Ayres Scale	35 (46 standard)
I. Irregular spacing	Breaks in words
J. Irregular slant	x
K. Faulty speed	37 (55 standard)
L. Incorrect position	average
II. Specific faults	
A. Letters	
1. Spacing	
a. Words crowded	
b. Crowding at right of paper	
c. Letters crowded	



## QUESTIONS

1. What is the relation between aims and objectives in a given subject and diagnostic and remedial work in the subject?
2. What data should the teacher record with respect to diagnostic and remedial work?
3. Make a list of several good tests available for diagnosis in various subjects. Also list any remedial materials provided to accompany these tests.
4. Examine the manuals of several diagnostic tests and list the skills and abilities they purport to test.
5. Look up the scheme for recording results provided by some good diagnostic test in elementary language.
6. Show how diagnostic and remedial work tend to individualize instruction.
7. In what ways might a mental test aid in the diagnosis and the planning of remedial work for a pupil having trouble in arithmetic?
8. In what ways might a reading test aid in the diagnosis and the planning of remedial work for a pupil who is failing in history?
9. What is the foremost purpose in diagnostic testing?
10. Show why the teacher rather than the superintendent or supervisor should be the one to do the work in diagnostic testing.
11. Which type of tests should be the more detailed and specific, diagnostic tests or survey tests? Why?
12. Why has diagnosis in the content subjects lagged behind diagnosis in the tool subjects?

## CHAPTER XXI<sup>1</sup>

### PSYCHOLOGY APPLIED TO THE MODERN SCHOOL

#### METHOD, CURRICULUM, GUIDANCE, AND EVALUATION

*Curtis Merriman, The University of Wisconsin*

#### I. Introduction

The purpose of the present chapter differs from the purpose of many of the other chapters in this text. In the other chapters the primary purpose has been to assemble scientific data bearing upon the technical question under discussion. Some attention has been given, of course, to the application of the facts presented. In the present chapter the primary purpose has been to consider the uses that may be made of the psychological data. The reader will therefore note from the chapter outline that the discussion starts with a statement by John Dewey written at a time when many of his claims were rejected by the educators of the time. The second selection shows how these early theories have been accepted by many modern schools. The selections dealing with the curriculum show how the present trends in psychological theory have had a positive influence in shaping the content of curricula and the methods of presenting that material. The selections on guidance and teaching show that knowledge of subject matter is only a part of the work of education. There is definite need for the development of a real art of guidance and teaching. The final selections are an expression of the trend to prove all things by their specific results. The school sets out to accomplish certain aims. It should also attempt to justify its existence by citing objective evidence that it is realizing those aims.

#### II. Psychological Objectives of Education

##### I. BY AN EDUCATIONAL THEORIST<sup>2</sup>

*John Dewey*

Hence the need of a school. In this school the life of the child becomes the all controlling aim. All the media necessary to further the growth of the child center there. Learning?—Certainly, but living primarily, and learning through and in relation to this living. When we take the life of the child centered and organized in this way, we do not find that he is first of all a listening being; quite the contrary.

<sup>1</sup> The materials in this chapter afford excellent supplementary reading in connection with the study of the following texts: Griffith, *An Introduction to Educational Psychology*, Chapter XIV; Skinner and Collaborators, *Educational Psychology*, Chapters XXIII and XXIV; Gray, *Psychological Principles of Education*, Part III; Hollingsworth, *Educational Psychology*, Parts II and IV; Leary, *Educational Psychology*, Chapters IX, X, and XIII; Mursell, *The Psychology of Secondary School Teaching*, Chapters V, VI, XV, and XVI; and Powers and Uhl, *Psychological Principles of Education*, Chapters VI, VII, VIII, and IX.

<sup>2</sup> From John Dewey, *The School and Society*. Chicago: The University of Chicago Press, 1900, pp. 53-54; 71.

The statement so frequently made that education means "drawing out" is excellent, if we mean simply to contrast it with the process of pouring in. But after all, it is difficult to connect the idea of drawing out with the ordinary doings of the child of three, four, seven, or eight years of age. He is already running over, spilling over, with activities of all kinds. He is not a purely latent being whom the adult has to approach with great caution and skill in order gradually to draw out some hidden germ of activity. The child is already intensely active, and the question of education is the question of taking hold of his activities, of giving them direction. Through direction, through organized use they tend toward valuable results, instead of scattering or being left to merely impulsive expression.

If we keep this before us, the difficulty I find uppermost in the mind of many people regarding what is termed the new education is not so much solved as dissolved; it disappears. A question often asked is: if you begin with the child's ideas, impulses and interests, all so crude, so random and scattering, so little refined or spiritualized, how is he going to get the necessary discipline, culture and information? If there were no way open to us except to excite and indulge these impulses of the child, the question might well be asked. We should either have to ignore and repress the activities, or else to humor them. But if we have organization of equipment and of materials, there is another path open to us. We can direct the child's activities, giving them exercise along certain lines, and can thus lead up to the goal which logically stands at the end of the paths followed. . . .

Life is the great thing after all; the life of the child at its time and in its measure, no less than the life of the adult. Strange would it be, indeed, if intelligent and serious attention to what the child now needs and is capable of in the way of a rich, valuable, and expanded life should somehow conflict with the needs and possibilities of later adult life. "Let us live with our children," certainly means, first of all, that our children shall live—not that they shall be hampered and stunted by being forced into all kinds of conditions, the most remote consideration of which is relevancy to the present life of the child. If we seek the kingdom of heaven, educationally, all things shall be added unto us—which, being interpreted, is that we identify ourselves with the real instincts and needs of childhood; and ask only after its fullest assertion and growth, the discipline and information and culture of adult life shall all come in their due season.

## 2. BY A MODERN SCHOOL<sup>3</sup>

*Rollo G. Reynolds and Mary Harden*

*The philosophy of the school.*—A school which attempts to educate children in a modern age must develop a philosophy which will allow it to be a modern school for modern children. The Horace Mann School believes that

<sup>3</sup> From Rollo G. Reynolds and Mary Harden, "Fundamental Philosophy and Purposes of the Horace Mann School," *Teachers College Record*, 36, 1935, pp. 649-652.

the school is an important agency for educating children, but not the only one which should assume responsibility for the total education of the child. It realizes that as one of these agencies, it will function completely only in so far as it creates within the classroom an environment which will aid pupils and teachers to live and learn together. The School also recognizes that in order to make this co-operative effort worth while, the environment must be extended to include realistically the community which surrounds the school. It is on this belief that the school brings its pupils into closer contact with other educative agencies in the community, such as churches, libraries, museums, newspaper plants, local government, and social service agencies, and endeavors thereby to acquaint the child with his surroundings, and to build up within him critical understanding and appreciation of these agencies, some of which may aid and some of which may, in some instances, deter social progress.

Although the Horace Mann School believes in co-operative living and endeavor, it does not lose sight of the very important fact that the child is an individual living in the present and that he should be allowed to learn to judge and act sensibly and constructively for himself as well as to think and act co-operatively with his group. The Horace Mann School accepts as its responsibility the duty of imparting to its pupils a knowledge of the activities and contributions of the people of past ages as influencing the present, just as man's activities and contributions to the present age will foster and stimulate a future age. Although the school believes that education is growth and that growth means the acquisition of accurate knowledge, the development of desirable habits, and the attainment of attitudes that will help the child to live happily and effectively, still it does not attempt to offer any fixed formula by means of which all children may be developed to their fullest capacities. The School, however, believes that there are at least four fundamental powers necessary to the complete education of a child.

(1) *The power to know*.—Each child should possess important and useful knowledge of the past and the present. The School, in the light of recent educational investigations, endeavors constantly to determine what is important and useful knowledge for the modern child, and insists upon its attainment within the individual child's capacity.

(2) *The power to do*.—The School subscribes enthusiastically to the philosophy of "learning to do by doing." It believes that the educative process is an active process, not a passive experience, that the interests of children are powerful incentives to learning, and that one of the principle functions of a teacher is to guide and direct these interests and help to create new ones. The School believes that through many situations occurring in school life, which offer opportunities for choice of action, the child will be aided in developing character and in forming habits of making right decisions. It believes that every child has within him something of the creative and that, through doing, this desire to create may have an opportunity to express itself and grow. Creative and directed activity as expressed in art, music, physical action, and

social organization function actively in the School's program. The activity program, however, has a plan and a purpose; so far as possible, its outcomes are foreseen and their values are weighed.

(3) *The power to think*.—Children are encouraged to think for themselves, and are trained to base their thinking upon scientific evidence. The School endeavors to substitute accurate knowledge and scientific evidence for misinformation and biased opinion, and at all times to help children formulate well-balanced opinions. It tries to teach the child to test his own thinking and likewise that of his group. It believes that children should be trained to think about those things which are important in their everyday lives and in the society of which they are an inherent part. It holds as its goal for each child the living of "the good life," which can be attained only by right choosing as the result of straight thinking.

(4) *The power to feel*. The School accepts as its responsibility the building of right attitudes. It believes that attitudes and feelings are the main-springs of human action; therefore tolerance, kindness, honesty, fair play, loyalty and other human attributes which make for fine and full living are constantly emphasized and consistently practiced. Some conception of life and the flow of civilization; a knowledge of power, its usefulness and destructiveness; an appreciation of the peoples of the world and their contributions to civilization—these are some of the concepts with which the School is concerned in training its children.

This then is the philosophy of the Horace Mann School. Its purpose is to develop individuals whose bodies are strong and healthy; who grow in insight, develop mental and spiritual powers, and acquire the self-direction necessary for resourceful living; who believe in education as an enduring quest for meanings; whose feelings toward the world and its people are unbiased and fair, and who will therefore fulfill the obligations that come with membership in a society; who desire to investigate and explore new fields of thought; whose knowledge of the world is accurate and broad; who think with trained minds; and whose actions, while expressing individuality, contribute to the welfare of the group, the state, and the world in which they live.

### III. The Educational Situation

#### I. METHODS OF DETERMINING THE CURRICULUM <sup>4</sup>

*William H. Kilpatrick*

Let us examine more closely how the educative process is carried on in such a curriculum unit. More specifically how study and learning go on when a child faces an actual situation to deal effectively with it. The effort at this point is to see the educative process going on in and through an instance of actual child-directed living.

<sup>4</sup> William H. Kilpatrick, "The Curriculum as a Process of Living," *Journal of the National Education Association*, 25, 1936, p. 55.

(1) Suppose a child faces a situation. First of all there is in him that which makes this a situation for him, and second there is in the environment something that so stirs him that he is moved to act. Only as these things happen together does a child face an actual situation.

(2) Facing thus an actual life situation, the second step is to analyze it, partly to set up or clarify ends, partly to get materials for the planning that comes next.

(3) The third step is to make one or more plans and choose from among them, for dealing with the situation. In a developing situation the plan will be in process of making from step to step as the situation develops. Planning is clearly an imaginative and creative step, but the imagination is checked and molded by the hard facts of the situation.

(4) Then comes the step of putting the plan into operation, watching meanwhile to see how it works, so that if need arise revision may be made.

(5) If the plan succeeds, a final stage is the backward look to see what has been done and how it might be done better another time.

## 2. VITALIZING THE HIGH SCHOOL CURRICULUM <sup>5</sup>

### *N. E. A. Bulletin*

*Variations in content of particular subjects to meet individual differences.* Equality of opportunity does not mean that all children are treated the same way. Mental diet must be varied according to the ability of the child to assimilate it. The school must present to children of little capacity subject matter that they can grasp, and to children of unusual capacity, subject matter which will stimulate them to full effort. A uniform course of study for all groups is unscientific and ineffective. Homogeneous grouping, special promotions, and individual instruction all provide that individuals advance at different rates of speed; but they make the mistake of presupposing that all pupils can ultimately learn the same things. The experience of many teachers is that even when dull pupils are given more time, they do not grasp the material as the more gifted children [do]. These pupils do not need a diluted form of algebra or Spanish or Latin, nor will their needs be met by a system of electives or by decreasing the number of subjects taken. The limited pupil frequently demands a different course of study. Failure must not become a habit, and experience shows that a certain degree of success must come to the pupil if further effort is to be carried on with fervor and wholeheartedness. Courses of study must be revised so that a proper amount of suitable work is required of those whose mental capacities are limited; and the course for superior minds must be so enriched that they will receive adequate stimulus and development. The problem of adjusting content and method of instruction to secondary pupils of different levels of ability is extremely difficult. Its solution waits upon careful analysis of the characteristic differences of bright

<sup>5</sup> Research Bulletin of National Education Association, "Vitalizing the High School Curriculum," 8, 1929, pp. 183-184.

and dull pupils and the adaptation of subject matter to these differences. Much experimentation is already in progress, but further observation and extensive research must be completed before anything except highly tentative conclusions can be reached.

### 3. WHAT IS PROGRESSIVE EDUCATION<sup>6</sup>

*Edward H. Reisner*

All psychology that would be considered authoritative to a progressive educator goes back to the new way of looking at mind which became necessary after Darwin and which was introduced into the American scene by William James' *Principles of Psychology* published in 1890. According to this point of view psychology becomes one of the life sciences—a branch of biology in the most comprehensive sense of that term, and mind is seen as the function of biological adaptation of the individual to his physical and social environment. One can hardly emphasize too strongly the significance of this new conception of mind for education. When it was introduced to American students of education there were in the field three forms of psychology battling for recognition or survival—the old, traditional faculty psychology in its inseparable connection with Christian theism; the mystical psychology of Froebel affiliated in its methods with absolute idealism; and the Herbartian psychology, which was a highly complicated version of associationist psychology—intellectualistic, abstract, and, in its extreme positions, artificial. The educational conflicts in the United States for almost a generation following the appearance of James' great work were conflicts among these various psychologies and their implications for education; but for twenty years now the new psychology which that work introduced has been dominant. Its triumph represents the basis for a new era in education, and whatever schools of psychological opinion have arisen within the comprehensive classification of functional or biological psychology, the broad educational implications of that conception of mind have been clear.

It became evident that education represented a process of progressive individual growth in relationships of mastery and adjustment in a concrete world of persons and things. Learning became a function of more efficient living. The school became a place for planning, doing, making, and judging. It was seen to be a small society in which social adjustments were to be made and desirable spiritual attitudes acquired through a process of spiritual contagion. The school took on new meaning as the environment within which learning took place. To that end it had to be reconstructed and reorganized. Materials, tools, equipment to do with had to be provided. Laboratories and shops became a necessity of the new order. The library took on life and meaning and swung into line as an active accessory in the learning process. Plays, games, and physical skills gained recognition as an integral part of the educational

<sup>6</sup> From Edward H. Reisner, "What is Progressive Education?" *Teachers College Record*, 35, 1933, pp. 195-197.

program. Many extracurricular activities were seen to be vital aspects of the school environment and were developed for fuller realization of the contributions which they could make. In these and other ways the new conception of mind as the agency of adjustment and mastery has changed the entire conception of the school as a learning environment and multiplied the dimensions of school education.

The new psychology also emphasized the powerlessness of the teacher in the face of an unaroused, uninterested pupil, and demoted from a place of honor that species of dull, slogging taskwork which had been the main exercise of the traditional school. It called attention in a new form to the teacher's role of assistance and leadership—assistance to pupils who were already on their feet and leadership of pupils who were really going somewhere with him. It called for meanings and organized experience. It has called, and is now calling insistently, for more intelligent selection of the school experience with reference to the living present of society and the inevitable future needs of the pupil—needs vocational, political, recreational, personal.

In another way, and one which is of the greatest importance, the new psychology has changed our conceptions of education. In the old psychological tradition which dominated American education up to the end of the nineteenth century, the human individual was intrinsically and fundamentally a soul. In the new psychology the individual has become a person. In losing his soul the individual has gained a personality, which would appear to be (for the individual) a profitable transaction. And what a difference it has made in our estimation of children and in our care for their development. Education has thus become participation in an act of sheer and unique creation. We have become involved in the absorbing and exciting job of assisting children to grow in wholeness and balance, in self-control, in social adjustment, in ethical attitudes and loyalties.

An immediate implication of this new recognition of personality is that the wide gap which has separated the school and the home must be filled. Parents are at least equally as important as teachers in this role, and each needs the co-operation of the other in this delicate process of creating a whole and happy man or woman out of an immature and growing boy or girl. Its implications for the vocational and educational guidance of pupils in the school are also pointed and inescapable. No less plain is the issue presented to the schools regarding their responsibility for character building and the creation of serviceable social attitudes in the pupils for those are the concrete stuff and matter of effective and useful personality. But above all it lifts into startling relief the responsibility of the school with reference to its total impact upon the pupil as a person—as touching his social adjustment, his self-confidence, and his sense of personal worth. As everyone knows, even the most progressive schools have done little or nothing about that. But they must, and some day will; if one of the profoundest implications of the new psychology for education is to be fulfilled.



4. CONVENTIONAL VS. ACTIVITY CURRICULUM<sup>7</sup>*Frank N. Freeman*

The suggestions here made are intended to give due recognition to activity, but, at the same time, to put it in its place in education. Activity needs, I believe, to be put in its place in two different ways. First, a sober and specific appraisal of the function of education should be substituted for the rather superstitious awe and reverence with which activity seems to be regarded by many educators. Activity seems to be thought to have some sort of mysterious and occult potency. It can do everything, from curing insanity to raising the intelligence quotients of feeble-minded children to the normal level. Let us not deceive ourselves. Activity is no such panacea. It has a function, an essential function, but it cannot work miracles. Finally after all due recognition is given to activity, the plain truth must be recognized that the distinctive learning and performance of human beings and the distinctive operations of education lie in the field of ideas and thought. After due recognition has been given to the activities that are useful either as ends or as instruments, the fact remains that the big job of education is to help the child, the youth, or the adult to understand the world he lives in, to recognize the problems that the world presents to him and to know and acquire the techniques by which to attack and solve these problems.

Man is very nearly on a par with the higher animals in the mechanisms of reception and expression. The chief respect in which he is superior in these two realms is in the versatility of manipulation. But even this advantage is due chiefly to his superior brain; men have been known to perform feats of skill without hands. The great contrast lies in the central part of the stimulus-response arc. This central part, to be sure, is part of the arc; it is not isolated from impression or from expression. But it is capable of relatively specialized emphasis. This specialized emphasis has produced, in the course of human history, our art, literature, science, politics, commerce and industry. It is the prime business of education by like emphasis to fit the child to participate in this rich and varied complex of human institutions and to do his part in their maintenance and advancement.

5. MEANING OF METHOD<sup>8</sup>*Harold Rugg*

(1) Education is not, and cannot be a science in the sense that physics, chemistry, and physiology are sciences. It does not have a unique body of primary concepts. It is fundamentally an art and a technology. The so-called scientific study of education has not produced a body of unique primary facts. On the contrary, it has taken over the assumptions and the techniques

<sup>7</sup> From Frank N. Freeman, "An Analysis of the Basis of the Activity Curriculum," *Elementary School Journal*, 35, 1935, pp. 660-661.

<sup>8</sup> From Harold Rugg, "Scientific Method in Education," *Teachers College Record*, 36, 1934, pp. 111-122. (Adapted in part.)

of the physical sciences and has applied the primary ideas which have been built up in the contributory sciences of physiology, psychology, and sociology. Hence our insistence that it is an art and technology. In the same manner that medicine builds bodies by utilizing the concepts of physiology, endocrinology, and the like, and that engineering builds machines and power of mechanics and mathematics, so education builds personality by discovering and putting to work the primary ideas and generalizations of physiology, psychology, sociology, and, to a lesser extent of the physical sciences. But a generation of quantitative study of education has failed to reveal an independent set of ideas which are uniquely the property of the educative process itself. Education has been hampered by this absence of primary concepts, but it has also been hindered by the lag in the application of the few basic facts that it does have.

(2) Too much of the research in education has been of the strictly quantitative kind. Captivated by the perfection of the quantitative elements in the scientific method, enamored of the precision of the measurement achieved in late nineteenth-century physical science, and inspired by the aesthetic charm of the mathematics of probability, investigators threw themselves enthusiastically into the task of making a quantitative description of American education.

(3) Many of the assumptions upon which this research has been founded may, at least, be questioned, as for example:

(a) Human nature is mechanism and not organism.

(b) Whatever exists, exists in some amount, and can be measured, and that we really know a thing only as we can measure it and describe it quantitatively.

(c) Human traits which are quantitative-qualitative fusions can be reduced to quantitative measures.

(d) Certain traits of an organism can be held constant, and changes which are produced in others can be measured by the statistical method of correlation.

(e) Education is something that goes on in a schoolhouse isolated from the life about.

(f) Education is something one does *before* entering life.

(g) Education is something one does with words and abstract symbols and with sensorimotor skill.

(h) Education can be measured competitively by some kind of rank-order statistical procedure.

(4) The foregoing criticism of the use of the scientific method is not to be construed as meaning that the art of education has no place at all for quantitative work. Such investigations will force a reconsideration of educational aims and a reconstruction of administration. The increasing utilization of scientific method in education is a fact of much importance. Certainly we shall keep the scientific method. But increasingly in the years ahead we shall discover its place and keep it there.

6. REALITY OF LEARNING SITUATIONS<sup>9</sup>*N. E. A. Yearbook*

*Adaptation to maturity of learner.*—The program should be adapted to the learner's level of development. An obvious case of the necessity for such adaptation is the use of reading materials, at each stage of the social studies, that are appropriate to the reading skill of the pupil. Many advocate, for example, that very little reading be required in social studies classes until the fourth grade or higher because of the problem of securing materials of appropriate reading difficulty in lower grades. The commonest complaint of teachers in early grades is that the children cannot read the book. One possible solution is the use, in addition to the textbook, of appropriate supplementary materials such as pictures and cartoons.

In addition to being adapted to the degree of control of the learner over the tools of learning, the course in social studies should be adapted to the learner's stage of development in power to perceive social relationships. There are many stages of the ability to sense relations and to make generalizations of differing degrees of abstractness and complexity. Children in the lower grades have had basic experiences with both conflict and co-operation between a child and his older brother or sister. They already sense the relationships that exist among people in their home and play groups. They learn early that father is more likely to grant a favor after dinner than before. Yet these same children may not have reached the stage of appreciating the significance to American citizens, of the chief crops of Brazil, or the effects of the Rockies on climate. Tests of reading readiness are being used increasingly to discover the appropriate time for introducing a child to reading. Perhaps there is need similarly for measures of readiness to learn about the Westward Movement, or about the characteristics of Egypt and the Egyptians, or about the implications of protective tariffs.

Adaptation to maturity may have another implication. Some abilities develop adequately through the natural process of maturation. Thus Courtis finds many pairs of words of apparently equal spelling difficulty over which the same degree of control is developed in the later grades even though one word in each pair is taught and the other is not taught. Ideally we should give but little consideration to those abilities which will be developed by the mere process of maturation.

7. THE BASIS OF METHOD<sup>10</sup>*W. L. Wrinkle and W. D. Armentrout*

What laws underlie effective methods of teaching? The methods of the bricklayer and the carpenter must be in agreement with certain physical

<sup>9</sup> *Fourteenth Yearbook of N.E.A.* Department of Superintendence, "Reality of Learning Situations," February, 1936, pp. 97-98.

<sup>10</sup> From W. L. Wrinkle and W. D. Armentrout, *Directed Observation and Teaching in Secondary Schools*, 1932, pp. 213-214. By permission of The Macmillan Company.

laws; the methods of the farmer must be in agreement with biological laws; the methods employed by the teacher must also be in agreement with certain laws, the laws of learning. The intelligent carpenter will not build a house without first having a sound foundation upon which to build. The intelligent teacher should not attempt to direct learning activity without first having a clear conception of the laws of learning with which the learning activity must be in agreement if it is to be most effective.

*The emphasis in traditional education was on:*      *The emphasis in modern education is on:*

- |  |  |
|--|--|
| 1. The activities of the teacher.                          | 1. The activities of the learner.                                |
| 2. The plans of the teacher as the determiner of activity. | 2. The needed activity as the determiner of the teacher's plans. |
| 3. The mastery of subject matter.                          | 3. The learning activity based upon effective technique.         |
| 4. The teacher's purpose.                                  | 4. The student's purpose.  |

The application of the knowledge contributed by modern educational psychology has brought about a very definite shifting in emphasis on different aspects of the teaching-learning situation not unlike the dispute over the relative importance of subject matter and method. It is evident that the activities of the learner are influenced by the activities of the teacher and that the teacher's purpose has much to do with the student's purpose; however it must be recognized that with respect to extent and values of the outcomes of activity to the learner (a) that what the student does is more important than what the teacher does, (a) that the needs of the student are a sounder basis upon which to plan activity than the opinion or interests of the teacher, (c) that subject matter is the material of learning rather than the end of learning, and (d) that the student's purpose has more influence in directing his activity than the teacher's purpose.

#### IV. Teachers and Guidance

##### 1. BASIS FOR EDUCATIONAL AND VOCATIONAL CHOICES<sup>11</sup>

*Percival M. Symonds*

*Interest as a deciding factor.*—In the long run his own interest is probably the safest guide for a boy to follow in deciding upon the curriculum he will choose or the occupation he will take up. In the first place, results reported in a recent study\* show that interest is one important factor on which at the present time choice of a boy's curriculum is based. On the other hand,

<sup>11</sup> From Percival M. Symonds, "On What Basis Should a High School Boy Choose His Curriculum?" *Teachers College Record*, 32, 1931, pp. 439-440.

\* O. K. Garretson, *Relationship between Expressed Preferences and Curricular Abilities of Ninth Grade Boys*, Contributions to Education No. 396, Teachers College, Columbia University, 1930.

ability, either general, as shown by an intelligence test, or special, as shown by an aptitude test, is of little consequence in determining which curriculum a boy will select.† Merely because a boy does choose his curriculum on the basis of interest is no reason *ipso facto* that he should do so. But there are two reasons for believing that perhaps the boy's own interest is the wisest guide that he can follow. In the first place, interest depends largely on his past successes; secondly, interest is likely to be influenced by any information which the boy obtains relative to his expectations of future success. Let us look at these two statements more closely.

*Interest depends largely on past successes.*—A genetic study of the development of interests would be extremely illuminating. In infancy interests are capable of taking almost any turn, being dependent on only the most general factors, such as keenness of the senses, intelligence, muscular power and co-ordination; and the like. On the other hand, in adulthood interests have become rather firmly established, so that it is infrequently and with great difficulty that a man makes a radical change in his occupation or even avocation. Between these two extreme periods, the interests are being molded. At first the broad trends are laid out, and one becomes inclined to interest in books, people, mechanical objects, animals, plants, sports, and so on. Gradually these interests become more and more specialized, so that the period of development is also the period for the specialization of interests.

In infancy, when neither interest nor ability has developed, the relationship between the two is nearly zero. In adulthood, when ability in various activities has reached a probable (not possible) maximum and interests have broadened, the relationship is fairly close. In between, the relationship is increasing. In childhood, when the broad interest trends are taking form and abilities are starting their differentiation, the relationship is low and interests are shallow, fickle, and unstable. The young child who has no skill in swimming probably has no special interest in swimming. What may appear to be interest would probably be more correctly termed curiosity. As he increases his skill, his interest keeps pace. The expert in any line whose ability is recognized is almost sure to parallel his ability with interest. The two increase together. In the junior high school period, however, the relationship is low enough that a measure of interest may be considerably at variance with ability.

*Interest is likely to be influenced by any information which the boy obtains relative to his expectations of future success.*—Every scrap of information that leads a boy to believe one occupation more desirable than another, or that points to his success in a certain occupation, is sure to influence his interest in that direction. If his past success points to future success, his interest is influenced. If he believes that certain occupations are more promising, or that the opportunities for entrance, promotion, and ultimate success are greater, such belief reacts directly on his interest. Social standing, general reputation,

†P. M. Symonds, *Tests and Questionnaires in the Guidance of High School Boys*. Bureau of Publications, Teachers College, Columbia University, 1930.

current gossip—all such influences tend to warp interest for or against an activity.

Since interests are so dependent on current gossip, the dissemination of correct information concerning activities, occupations, school offerings, and individual achievement and ability becomes of prime importance. The "occupation class" in which the conditions of different kinds of work are discussed is extremely important in the work of guidance, for such discussion helps to build ideals and to determine interests.

## 2. SOME MARKS OF A GREAT TEACHER<sup>12</sup>

Glenn Frank

President, University of Wisconsin

(1) *The great teacher never stops studying his subject.*—He does not lecture year after year from the same dog-eared notes. He is in the best sense of the word a research man. This does not, of necessity, mean that he is forever publishing monographs and books in his field. Frankly, when I have an appointment to make, I refuse to be impressed by a long list of research publications until I have seen the candidate and get the feel of his mind, for some of the liveliest minds in the world of scholarship are not forever rushing into print, and some of the dullest are. I am convinced that a very definite harm has been done to our universities by the emphasis we have put on publication qua publication by the teachers we appoint. We need men of wide knowledge and penetrating wisdom, and many teachers would be broader and wiser men if they studied and thought more and wrote less.

(2) *The great teacher establishes a personal as well as professional relation with his students.*—I confess that I lose interest in a teacher when I discover that he never sees his students save in his classrooms and in his office at stated and limited hours. The great teacher is willing to have his private life broken into by eager students who come into his home at odd hours for informal and unofficial intellectual wrestling bouts. All this is a taxing enterprise. But who ever said that the life of a great teacher is an easy life?

(3) *Whatever the great teacher may be teaching, it is for him a window through which he looks out upon the whole universe.*—No curriculum can ever catch the complex of a living moving world. The world of 1934 will be different from the world we interpret to the senior of 1933. The great teacher gives the student a way of looking at his world by the way he teaches his specialized field. As an undergraduate, I learned ways of thinking about politics from chemists, and had foreign policy illuminated by geologists.

(4) *The merchandising of information will never seem to the great teacher his main purpose.*—The kindling of the student's will, the enrichment of his emotions, the illumination of his imagination, giving him sensitivity and eagerness of mind, will seem to the great teacher more important than all else.

<sup>12</sup> From Glenn Frank, "Some Marks of a Great Teacher," *The Phi Delta Kappan*, 17, 1934, p. 5.

(5) *The great teacher will not think he has failed if one of his students fails, but only if the student has not wanted to succeed.*—An awakened will will survive more than one specific failure, but a mind left asleep indicts the teacher.

(6) *The great teacher will not think it beneath his dignity to pay attention to the art of presentation.*—There is no intrinsic connection between scholarship and unintelligibility. The great teacher will never be content to show knowledge on the counter with a take-it-or-leave-it air. He will strive to make intelligence intelligible.

(7) *The great teacher will never speak of his classroom work as routine teaching.*—There cannot be routine teaching. There can only be routine teachers.

(8) *The great teacher will be inspiration without sacrificing a rigid realism of fact and idea.*—Many "popular" teachers are essentially shoddy showmen whose stock in trade is amiability and a playing down to student sloth. But the most profoundly inspirational teaching arises from reality presented with artistry.

(9) *The great teacher has a gracious spirit and a tonic gayety of mind because, first, he conceives teaching as an exhilarating enterprise, and, second, because he approaches his task with a sense of confidence.*—Harassed and incompetent teachers are so because they are not adequately equipped for their task and fail to sense its intrinsic importance. Happy and effective teachers are so because their training gives them a sustaining sense of competence and their inborn quality of mind enables them to see the greatness of the teaching mission.

The great teacher brings to his business accurate and wide knowledge, an informed technique, intelligence, energy, initiative, adaptability, common sense, high standards of personal character and professional achievement, singleness of purpose, sympathy, a rich social background, and a convincing sincerity of personality.

## V. Educational Response

### I. RESPONSE IN RELATION TO PURPOSE<sup>18</sup>

#### *N. E. A. Yearbook*

Among these purposes the following are generally accepted as obligations of education in the social studies.

1. It is the purpose of the social studies to give to pupils the truest and most realistic knowledge that is possible of the community, state, nation, and world—the social and physical setting—in which they live and are to live and make their way. [Discussion omitted here.]

2. A second purpose of instruction in the social studies grows out of the

<sup>18</sup> *Fourteenth Yearbook of N.E.A.*, Department of Superintendence, "Social Studies Curriculum," 1936, pp. 57-59. (Adapted in part.)

first, namely, preparation of pupils for promoting a wiser and more effective co-operation among regions, areas, individuals, groups, communities, states, and nations—a co-operation interracial, interreligious, and intereconomic. [Discussion omitted here.]

3. A third purpose of instruction in the social studies is to develop character: to give the pupils a love of truth, an appreciation of the beautiful, a bent toward the good and a desire and will to use knowledge for beneficent social ends. [Discussion omitted here.]

4. A fourth purpose of the social studies, although it may come under the head of method, is both a purpose and a prerequisite to the attainment of other purposes; it is training in the intellectual processes indispensable to the functioning of society. These processes include acquiring knowledge concerning sources of information respecting social questions and realities, skill in the use of these resources, skill in selecting, verifying, and checking these sources for authenticity, skill in exploring and stating various sides of controversial issues, and skill in discussing and weighing them. American democracy works through study of appearing needs, formulation of remedial measures, public discussion, adjustment and compromise, decision and action. The intellectual processes requisite to individual life are akin to those operating in American society. It should therefore be reckoned a prime purpose of the instruction in the social studies to give training in the exercise of analytical, critical, verifying, and constructive powers through school practice in numerous concrete cases, historical and contemporary. Here history is especially useful in that it is more remote from the heats and distempers of contemporary life.

## 2. COMPARISON OF OLD AND NEW TYPE TESTS <sup>14</sup>

*Truman L. Kelley and A. C. Krey*

*Testing understanding.*—The understanding of ideas is generally considered to be a much more important outcome of social science instruction than any body of specific information. Ability to apply the idea correctly to a new or unaccustomed situation would usually imply understanding. Ability to select from a group of related ideas the one which most accurately meets a given situation would likewise indicate some understanding. Ability to trace the probable ramifications or relations of an observed social phenomenon would also afford evidence of understanding of the idea involved. Mere ability to repeat a definition of the idea would be unconvincing—especially if repeated in the exact words of text or instructor. It might be then merely a verbalism having no more meaning than any other combination of words. The essay-type test has long been used, with varying degrees of reliability, to test understanding. The student's extended discussion usually offers sufficient latitude to reveal not only the understanding of the idea but also the degree

<sup>14</sup> From Truman L. Kelley and A. C. Krey, *Tests and Measurement in the Social Sciences*, Report of Commission on Social Studies, Part IV. New York: Charles Scribners Sons, 1934, pp. 98-101.



of that understanding. If the new-type test could also be applied to this end, it would afford the teacher an opportunity to test a much greater range of ideas in a shorter time and thus afford a fairer and more complete indication of the student's attainment of understanding. The discussion of the Wesley, Kelty, and Pressey tests has indicated that this type of value can also be reached to a very appreciable extent by means of the new-type test. Discrimination between related ideas, ability to apply known facts to a new situation, and even some test of the student's ability to trace relationship, have all proved possible. The construction of such tests, however, is much more difficult, the possibilities of standardizing such tests less certain. It is not clear that they can be made to supersede the essay-type of question for this value, but it is clear that they can be made a very helpful supplement.

*Testing skills.*—The scholar's mastery of the skills of his calling is demonstrated in the successful execution of a thesis. This is comparable in the field of learning to the masterpiece of the craftsman in the manual arts. Most pupils, however, stop short of the higher degree in any of the social sciences. For the earlier stages such devices as a course or term paper, an individual topic, afford the student opportunity for the use of skill. All such devices might be described as exercises demanding the individual use of skills involving both knowledge and practice. They require extended time. Whether the new-type test can be developed to afford a more rapid, yet accurate, test of the student's possession of the skills remains to be determined. The two tests developed for this investigation, the one on geography and the other on historical criticism, were essentially exercises which made use of new-type questions. In so far as skill involves a certain body of precise knowledge, new-type tests can be developed to test such knowledge. In so far as skill is a matter of practice and use, it seems doubtful whether the new-type questions can be of much help. The hint contained in one of the exercises mentioned under skill, that the knowledge essential to a skill is not retained except through practice, might suggest that the new-type test could be used fairly far in testing skill. A test of the knowledge applied sufficiently long after that knowledge was imparted might, if the knowledge were still present, give adequate evidence of the use of the skill. Much additional work, however, will be needed before the new-type test technique can be used except as a supplement to exercises. There is one skill which may, indeed has been, seriously impaired by the excessive use of the new-type test. This is skill in expression, the ability to set forth some topic in social science clearly, convincingly, and agreeably. Teachers in college have begun to remark that students who come to them from school systems in which the new-type test has been used almost exclusively for a number of years are unable to express themselves cogently either orally or in writing. In school systems in which the new-type test has been used extremely, it has been possible for students to avoid writing a single complete sentence except in courses in English composition. Inasmuch as coherent and cogent composition is still one of the most widely used, as it is one of the most valuable skills in social science,

it would seem essential to continue to use the essay-type examination, if for no other reason than to afford practice in this skill.

*Testing interests.*—The discussion of interest as an outcome of instruction indicated that interest was strongly conditioned by the individual's emotional set. A test seeking to discover the evidence of interest in a given class would, therefore, have to provide for a wide range of interest. Such a condition would defeat the ends of efficiency which particularly recommend the new-type test. The essay-type question, which, by its very elasticity, permits the student freedom to reveal his thinking and reading, is probably the most economical method of discovering evidence of a sustained interest developing out of the work in the subject. This type of question especially invites the creative and constructive interest of the good student. A proper appraisal and appreciation of this evidence requires the competent judgment of an expert teacher, scholar, or both. It also involves the conscious employment of the essay-type examination as a test of interest.

*Testing attitudes.*—The pitfalls of a direct effort to test the attitudes of students on questions which they regard as important and about issues of a controversial nature are so many as to defy any form of test. The new-type test is most direct and perhaps, therefore, least efficient in gaining results. The essay-type affords the pupil an opportunity to reveal his attitude on many questions. The methods used by the historian in checking act against verbal statement may still be the surest method of determining real attitudes. Next to that, the essay-type, as interpreted by the teacher, would promise to yield most satisfactory evidence.

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## EXERCISES

1. From a study of the selection from John Dewey (II, 1), point out evidence to show that Dewey could advocate both the child-centered and the society-centered school.
2. What do you regard as the most distinctive feature of the philosophy of the Horace Mann School (II, 2)?
3. Basing your judgment on the Dewey selection, decide whether Dewey would accept the greater part of the Horace Mann School program.
4. From a study of the chapters on learning decide whether such schools as the Horace Mann are based upon sound educational psychology.
5. To what extent will a correct choice of curricular material insure sound method procedures, and vice versa?
6. How would the advocates of the progressive schools which use an activity type of organization meet the questions raised by Professor Freeman (III, 4)?
7. Make a careful study of your own educational observation and experience to see if you can find any specific evidence to warrant Mr. Rugg's questioning of certain educational assumptions (III, 5).
8. In the light of the Wrinkle and Armentrout contrast (III, 7) between the traditional and the modern school, analyze your own education to find the extent to which it measures up to modern standards.
9. Using President Frank's discussion as a basis (IV, 2) make a study of the characteristics of the best teacher you ever had.
10. Compare the Kelley and Krey position on tests and marks (V, 2) with the work reported by Hartshorne and May in their *Studies in Deceit*.

## CHAPTER XXII <sup>1</sup>

### PERSONALITY

*Seth Wakeman, Smith College*

#### I. Introduction

There would be, at the present time, little disagreement with the statement made by Burnham that "The supreme aim of education is the preservation and development of a wholesome personality in every child." \* If one considers the definitions of aims of education as stated by educators only a short time ago, the contrast becomes very striking and illuminating. In the sciences, also, from which education draws its data—biology, psychology, and sociology—the validity and usefulness of the older concepts are now being questioned, and emphasis is being placed upon such terms as "unity" or "wholeness" of the organism, the "structure" and "integration" of the personality. In popular usage, the term "personality" has become a very popular catchword. But the mere fact that such terms are being used does not necessarily indicate or imply a real understanding of the term. In fact, there is a grave danger that the genuine appreciation of the problems concerning personality will be obscured by the use of facile phrases. There is undoubtedly vagueness, hazy thinking, and unscientific generalization concerning the subject of the personality, but the fact that there is such a general emphasis upon the concept is indicative of a revolution in the intellectual world. Here we are primarily concerned with the attempt to understand the personality of the individual in terms of behavior and the way in which different kinds of personality are developed—in other words, with the psychological and educational problem.

Education has in the past, of course, been dependent upon, and has reflected the current philosophy and psychology. Up to recent times, psychology has considered the individual in terms of individual traits, capacities, attitudes, and functions, which, when put together in some way, presumably made up the individual. This atomistic, or piecemeal, attitude did not, and could not, yield an understanding of the total behavior of the organism, and when applied to education has resulted in a distortion of the educational process. Gestalt or configurational psychology, reinforced by organismic biology, with the doctrine of the primacy of the whole, has given a new impetus to the study of the wholeness of the individual, or the personality. The personality of the individual is a totality which is more than the sum of its parts. A listing of various traits, habits, dispositions, etc., does not give the whole individual since it leaves out the essential nature of the organized structure. As Vernon points out, each single characteristic has to be

<sup>1</sup> The selections in this chapter afford valuable supplementary reading for students who have read discussions of the topic in any of the following books: Griffith, *An Introduction to Educational Psychology*, Chapter VIII; Skinner and Collaborators, *Educational Psychology*, Chapter X; Benson, *et al.*, *Psychology for Teachers*, Chapter XIX; Stroud, *Educational Psychology*, Chapters XIV and XV; Averill, *Educational Psychology*, Chapter XVII; Gates, *Psychology for Students of Education*, Chapter XVII; and Pintner, *Educational Psychology*, Chapter IV.

\* Burnham, W. H., *The Wholesome Personality*, New York: D. Appleton-Century Company, 1932, page 687.

considered in relation to the whole; the radicalism of an introverted individual is different from an equal degree of radicalism in an extraverted individual, for each trait is dependent on, and modified by, the balance of all the other traits.\* Gestalt psychology conceives of the personality as a unique whole, a total structure that cannot be broken up and analyzed into parts. It raises the question, also, of what this uniqueness consists.

The practicing psychiatrist has also contributed greatly to the clarification of the problem of personality. Faced with the problems of mental disorder, the psychiatrist found that the older atomistic, or academic, psychology was of little assistance in understanding the problems with which he was confronted. He was concerned with the total behavior of the whole individual in a certain environment. The psychology of personality, in the modern sense, really has its origin in the case history of the psychiatrist. Here he was not concerned with the functioning of the discrete parts of the individual, as the psychologist had been, but with the whole individual. Sociologists and cultural anthropologists have become interested in the personality in the social environment and the rôle of cultural influences upon the personality.

In education, the modern, or "progressive" school, has insisted upon the education of the whole individual in opposition to the older, and unfortunately still current, emphasis upon the training of the intellect and not of the whole person. The education of the mind and the education of the body had been looked upon as two distinct problems, and the individual had been treated in a piecemeal fashion. The influence of the mental hygiene movement, with its emphasis upon the unity of the individual and the necessity for the development of the wholesome personality, has also had a very considerable influence upon educational thought. Education would consider the statement quoted above from Burnham to be reasonable and in accord with the best thought in the disciplines which have to do with the understanding of the behavior of the individual.

In presenting selected readings upon the subject of personality, the scanty and inexact status of our knowledge of the subject must be emphasized and insisted upon. There is a very wide diversity of theories upon the subject and the literature in the past few years has increased at a rapid rate. The readings in this chapter are designed, not to encompass the whole field, but to be suggestive and illustrative of the approaches that are now being made to the subject by writers in the various fields which deal with this problem. It will be clear to the reader that here is a fertile field for experimental research and that a fuller understanding which will lead to better and sounder educational theories and practice must be dependent upon such research.

## II. The Nature of Personality

### 1. PERSONALITY AS A WHOLE <sup>2</sup>

*J. C. Smuts*

General J. C. Smuts in a remarkable book, *Holism and Evolution*, which has been too little known and appreciated, in presenting his philosophy of Holism—

\* Vernon, R. E., "Can the Total Personality Be Studied Objectively?" *Character and Personality*, 4, No. 1, September, 1935.

<sup>2</sup> From J. C. Smuts, *Holism and Evolution*. New York: The Macmillan Company, 1926, pp. 263, 281.

the whole—considers the problem of personality and the reasons it has not received more attention. He states in modern scientific terms the doctrine that personality can only be understood and evaluated in terms of wholes.

Personality is the supreme embodiment of Holism both in its individual and its universal tendencies. It is the final synthesis of all the operative factors in the universe into unitary wholes, and both in its unity and complexity it constitutes the great riddle of the universe. Best known of all subjects of knowledge and experience, nearest to us in all kinships and relationships, our very foundation and constitution, self of our very selves, it is yet the great mystery, the most elusive phantom in the whole range of knowledge. No wonder that some go the length even of denying its existence, and look upon it as a veritable phantasm of the mind. And yet it is the most real of all reals, the latest and fullest expression of the supreme reality, which gives reality to all other reals. Its uniqueness and its incomparability make it difficult of approach by the usual methods of scientific procedure, and hence it has been avoided by science completely, and by psychology and philosophy to a very large extent. . . .

The treatment that psychology has given to Personality is another instance of this failure to appreciate its real and unique significance. Psychology as a scientific discipline deals with the human mind, not in its individual uniqueness, but in its general character as distinguishing all human beings. . . .

The result has been that from a psychological or any other practical point of view very little attention has been devoted to the study of Personality. Personality has been the concern of no particular branch of study, and it still awaits a proper treatment of its own as a distinct discipline among other scientific and philosophical disciplines. Its province falls within the large debatable territory between science and philosophy, between theory and practice, which has been very little explored and is still *terra incognita* to all intents and purposes. . . . But beyond a doubt it is going to occupy a foremost place in the attention of inquirers in future. And the time may come when the science of Personality may be the very keystone of the arch, and serve to complete the full growing circle of organized human knowledge.

## 2. PERSONALITY<sup>3</sup>

*Kurt Koffka*

Gestalt psychology, as stated in the introduction, offers a new psychological understanding of personality. Koffka, in his recent book, gives a thorough and stimulating systematic presentation of psychology from this point of view.

The problem of personality is one of the intrinsically greatest problems of all psychology. Nowhere is it easier to miss the point, and to run either into the Scylla of blind statistical investigation of traits, or the Charybdis of

<sup>3</sup> From *Principles of Gestalt Psychology*, by Kurt Koffka, copyright, 1935, by Harcourt, Brace and Company, Inc., 1935, pp. 677-679.

ultimately unscientific abstract discussion. It is easy to comprehend why men of culture and knowledge who were interested in the study of personality turned away with contempt from work done on this problem by experimental psychology and claimed that no "explanatory" psychology could ever master this problem, and that only a psychology different in essence, an "understanding" psychology, would be equipped to deal with it. We discussed this dilemma in the first chapter and refused to accept it. Our reason lies in our general principle: if psychology reveals organization, i.e., intrinsic connections of properties, and if this holds for personality as well as for the other fields we have studied, then indeed psychology should reveal personality in all its richness and significance by its general methods.

*Is personality a gestalt?*—The question, therefore, can be formulated: Is personality a gestalt, and if so, what kind of gestalt is it? These are concrete questions which can be investigated by scientific methods. What would it mean if personality were not a gestalt? That its different behavior units or traits were independent of each other and could be united in any combination. If, on the other hand, personality is a gestalt, then there would be interdependence between its various manifestations, and a great number of combinations of traits would be excluded.

If we remain in the realm of experimentally established facts, we have to confine our purview to a relatively small number of relationships, to those, namely, between character—or personality—traits and physiognomic characters. The last year has seen the publication of a highly important book on expressive movements by Allport and Vernon, at the end of which the authors formulate the following conclusion, based on a vast material of experimental results: "The evidence indicates clearly that the expressive movements of personality are not specific and unrelated; on the contrary they form coherent, if perplexing patterns. . . . From our results it appears that a man's gestures and handwriting both reflect an essentially stable and constant individual style. His expressive activities seem not to be dissociated and unrelated to one another, but rather to be organized and well patterned. Furthermore, the evidence indicates that there is congruence between expressive movement and the attitudes, traits, values, and other dispositions of the 'inner' personality." \* And this conclusion is not reached lightly, but after a thorough discussion of other findings and theories as well as of their own results.

I shall mention only one other piece of experimental work, since Allport and Vernon's book gives an excellent survey of the literature; this is an investigation from the University of Berlin by Arnheim. He asked his subjects to match different aspects or expressions of persons—for example, handwritings, with known personalities (Leonardo, Michelangelo, Raphael), or portraits with handwritings; again portraits of men with quotations from their writings or descriptions of certain modes of behavior (like drinking habits). The number of correct matches was always greater than chance would have decreed

\* Allport, Gordon W., and Vernon, Philip E., *Studies in Expressive Movement*. New York: The Macmillan Company, 1933, pp. 247-248.

and often considerably greater, and many errors were "good" errors, inasmuch as the matching was not at fault but the understanding of one of the terms—thus in the experiments with the great painters very few confusions between Michelangelo and Raphael occurred. There were in all 779 matches, and of these only 36 were co-ordinations of Michelangelo's writing to Raphael or Raphael's to Michelangelo, whereas the correct co-ordinations for Michelangelo, Raphael, and Leonardo were 221, 192, and 175.

Results like these, just like the good agreement in the judgments of Wolff's subjects (in the experiments described above), can be looked at from two different points of view. On the one hand they prove that physiognomic judgments are possible, fairly uniform, and much oftener correct than can be expected from mere chance. On the other hand they confirm Allport and Vernon's conclusion; for these judgments could not be correct as often as they are if *any* combination of traits were equally possible. If the handwriting of Michelangelo did not possess some characteristics which were *indicative* of the person as he was known to the judges, how could they have acquitted themselves so well! Thus physiognomic experiments lend a weighty support to the view that personality is a gestalt. . . .

Present-day psychology has rediscovered the importance of the problem of personality without which no psychology is complete, and many writers have made valuable contributions to it; among them William Stern and McDougall must be specially mentioned. I shall, however, forbear to report their views, since I could contribute nothing over and above the questions which I have just formulated. Gestalt theory has been rather consistent in its development. It has studied the fundamental laws of psychology first under the most simple conditions, in rather elementary problems of perception; it has then included more and more complex sets of conditions, turning to memory, thinking, and acting. It has started to approach those conditions under which personality itself enters the investigation. But since this is but the barest beginning it seems wiser to bide our time.

### 3. THE DOCTRINE OF PERSONALITY TYPES <sup>4</sup>

*L. F. Shaffer*

A very considerable amount of the literature, particularly by psychoanalysts and psychiatrists, on the subject of personality, has been from the point of view of "types," and many of the terms used in this approach have come into common usage, such as "introvert" and "extravert." These classifications, at times very suggestive, describe personality in terms of typical patterns of behavior instead of in terms of their uniqueness. The more elaborate and comprehensive a classification, the more artificial and useless it appears.

Since the differentiation of personalities involves the determination of "what kind of a person" a given individual is, a very natural tendency is to

<sup>4</sup>From L. F. Shaffer, *The Psychology of Adjustment*. Boston: Houghton Mifflin Company, 1936, pp. 284-287.



classify all mankind into various *types*. Human attention is easily attracted to that which is striking and different, hence we tend to think of persons as being good or bad, bright or dull, and tall or short. That these qualities are really present in a continuous gradation from one extreme to the other, without any definite separation into classes, is often a difficult concept to grasp. In the field of personality, where quantitative measurement has been slow in development, the habit of dividing people into types has been especially prevalent and persistent.

The classification of personality types was one of the earliest activities within the field of psychology. Theophrastus, a contemporary of Aristotle, wrote thirty sketches of types of human personality that are still remarkable for their freshness and clarity. The most influential of the ancient concepts of personality types was that of the four temperaments, which is ascribed to Hippocrates (400 B.C.) and modified by the Roman physician Galen. The *sanguine* temperament was described as active and quick but lacking in strength and permanence. The *choleric* was easily aroused and strong but irascible; the *melancholic* was slow and pessimistic; the *phlegmatic* was slow and also weak and stolid. The four temperaments were ascribed to an excess of one or another of the bodily fluids or "humors" which were designated as blood, yellow bile, black bile, and phlegm, respectively. Normal personality was believed to result from a proper balance of all the temperaments, an interesting forecast of the concept of integration. During the Middle Ages and well into the modern period the doctrine of the temperaments was accepted as undeniable truth. Centuries of belief in the notion of separable types of personality has not been without its effect on social tradition. The ready acceptance that has greeted the more recent attempts to define personality types is undoubtedly due in part to a persistence of ancient and medieval ways of thinking.

The number of ways of classifying personality types that have been proposed in recent times almost defies enumeration. One of the most interesting is the division between *rationalist* and *empiricist* of William James (1911). The rationalist or "tender-minded" person is guided by principles and abstract ideas and tends to be idealistic and religious. The empiricist is described as "tough-minded" and practical, influenced by facts and expediency. The correspondence of these types to two of Jung's, which will be described later, is striking.

A number of type classifications have been based on the characteristic differences observed between persons suffering from the two most common forms of serious mental disorder, dementia praecox (schizophrenia), which has already been mentioned, and manic-depressive psychosis which is characterized by extremes of either emotional exaltation or depression. The *autistic* or *schizoid* type is described as shy, uncommunicative, given to fantasy, showing few external interests, and not participating in social pleasures. The *cyclothymic* or *cycloid* personality, in contrast, is given to ready emotional expression, ready to cry or to scream, and likely to be boisterous, talkative,

and unstable. It is at least true that patients manifesting the two varieties of psychosis mentioned frequently show a history of having had these symptoms, and that the same traits are present in lesser degree in many other people. Rosanoff (1927) distinguishes two other abnormal types in addition to the autistic and cyclothymic. These are the *antisocial* personality which he believes to underlie hysteria, malingering, and criminality, and the *epileptic* personality. The last two named types have not been so widely accepted, as the first is usually regarded as a mixture of several diverse elements, and the second as obvious and not widely applicable.

*Jung's types.*—No other classification of types has aroused more interest, research and controversy than has that proposed by Carl G. Jung (1923). His best-known distinction is between the "general attitude types" of *extravert* and *introvert*. Briefly stated, the extravert is one who is dominated by external and social values, while the introvert takes a subjective view and is governed by the relationship of things to himself. The characteristic differences between the two types, as described by Jung, may be tabulated as follows:

#### EXTRAVERT CHARACTERISTICS

1. Directly oriented by objective data
2. Conduct governed by necessity and expediency
3. Accommodates readily to new situations
4. Is negligent of ailments, not taking care of self
5. Adjustments are compensatory
6. Typical psychoneurosis is hysteria

#### INTROVERT CHARACTERISTICS

1. Subjective determinants are the more decisive ones
2. Conduct governed by absolute standards and principles
3. Lacks flexibility and adaptability
4. Is overattentive to ailments and careful of self
5. Adjustments are made by withdrawing and phantasy
6. Typical psychoneurosis is obsession or compulsion state

This enumeration represents the extravert as the man of action and the introvert as the man of deliberation, which is the conception that has had the greatest influence on psychological discussions of personality. Jung's own complete picture of personality types is not quite so simple, and the usual condensations are perhaps somewhat unjust to his entire theory. In addition to the general attitude types so far described, Jung also distinguishes four special "function-types" based on his analysis of the chief varieties of human expression. These are stated as *thinking*, *feeling*, *sensation*, and *intuition*. According to Jung, one or another of these four processes is especially differentiated or well-developed in a given individual and hence plays a dominant role in his adaptation or orientation to life. Since the extravert-introvert classification overlaps the four special types, eight principal classes of personality are indicated. The "extraverted thinking type" is concerned with facts and their classification, the "introverted thinker" with theories and with their application to himself. The "extraverted feeling type" wishes to be in harmony with the outside world and is able to achieve close sympathy with others, while the "introverted feeling type" is chiefly concerned with his internal

harmony and tends to depreciate the influence of outer factors. The "sensation" types, principally influenced by pure pleasure and pain, and the "intuitive" types, dominated by indirect judgments or "hunches," are also either extraverted or introverted. This doctrine is further complicated by Jung's assertion that more than one of the four main functions may be important, and that an individual may be extraverted in one function but introverted in another. Also, if the "conscious" is extraverted in any one line, the "unconscious" attitude is introverted and vice versa. Jung's complete theory counteracts the excessive simplicity of the primary extravert-introvert classification, but does so by plunging into complications bordering on obscurity.

Jung, like most of the strong proponents of definite types, considers all persons to belong definitely to one or another class, and assumes these differences to be inborn. He states that they can be modified, as when a natural-born introvert is forced by circumstances into extraversion, but believes that such transformations are superficial and that an abrupt change is likely to result in a psychoneurotic condition.

### III. Heredity and Environment in Personality

#### I. THE PATTERN OF PERSONALITY <sup>5</sup>

*Abraham Myerson*

Personality is the organizing of the mental life of the individual into a compound pattern made up of his powers of thinking, feeling, and doing. Just as a picture has its artistic value not through color, form, or pattern but through the organization of these qualities so that something new and beautiful is added to the world, so personality is not the sum total of feeling, intelligence, and act but is a function of the interaction of these phases of mentality. Thus the types of personality become almost infinite as we combine the many grades and specialties of emotion, intelligence, will, and act. For example, the whole personality may be centered in a successful drive around some point of superiority, such as a special beauty, agility, strength, or intellectual capacity, just as it may be wrecked around some point of inferiority, some excessive feeling, aberrant instinct, or focal failure of inhibition.

It is a truism to say that personality is laid down by heredity, that what we achieve in the organization of our trends is dependent on the nature of the germ plasm. This must be true. We cannot reach what we have not the capacity to reach, but the direction and form of our trends are given by the environment and we can never tell while viewing any individual characteristic how far its nature has been determined by heredity and how big a part environment has played. Feeling, thought, and deed are social products and are not created in a vacuum. Each individual is born into a home, a race, a nation, and a time, and from the start of his life there is a determined, even

<sup>5</sup> From Abraham Myerson, "The Pattern of Personality," *The Survey*, Graphic Number, 66, No. 1, pp. 22-23.

fierce, pressure put on him to make him feel, think, and act in conformity with the large and small groups with whom he is in contact; to inhibit in him those trends which are out of line with theirs, to foster those which are approved. To say that environment is not hugely important in the evolution of the personality is to state that the home, the school, the pulpit, the book, the newspaper, the friend and the foe, the judge, prison, law and religion, tradition, social approval and disapproval, praise and blame—to say nothing of the economic structure, the climate, and the food—are not of importance. For these are but a few of the environmental influences operating from the cradle to the grave, making and marring personality, organizing and disorganizing it. . . .

As one walks the streets of a city like Chicago, a very interesting confirmation of the value of the environment in the creation of personality is evident. One sees transplanted Slavic peasants, to take one immigrant type, stalwart, heavy featured, settled in their beliefs and in their ways, living with little of broad environmental interest, leading a parochial existence, carrying on under the influence of age-old traditions—and then one sees their American-born descendants, alert, nervous, unsettled in tradition, living the typical American life of seeking excitement and advancement, as different from their ancestors as an American is different from a peasant in some Polish village. The same change can be seen in the American-born descendant of the Irish peasant and the American-bred descendant of a ghetto dweller.

This brings into the situation such questions as whether or not woman is different from man psychologically and in personality through the biological differentiation of sex or because of different breeding and training. I cannot answer this question. Undoubtedly biological differentiation is associated with fundamental psychological difference. But this is true, that a boy baby and a girl baby, though born under the same roof, sleeping in the same bed, eating the same food, are nevertheless living under different environmental forces and in different worlds. From the start the boy is trained toward fortitude, fighting spirit, and achievement. From the start the girl is subject to those influences in the community which make for personal vanity, gentleness, emotionality, and lack of achievement. It may be that the boy and girl are praised for what are natural qualities, though I doubt this. I believe that they are praised for what men have felt to be desirable qualities for *them*, and especially is this true of the girl.

For many women, the main achievement in life is to be beautiful, an achievement, alas, which only a few can reach and in the striving for which a petty world is established. We cannot say whether women have as much latent intellectual capacity as men until the tradition of life makes achievement as praiseworthy and highly desirable for them as it is for men; until tradition establishes the fact that it is not unwomanly to be ugly and intellectual. In other words, whatever the potentialities of a woman are, the environment selects certain qualities to develop in her and elects to suppress and inhibit other qualities. The environment operates on each boy in a selec-

tive way quite differently from its operation on the girl and so part of the differences between the adult man and woman in our present day represents the selective environmental influences.

This brings up the whole question of eugenics and eugenics. The eugenists are apt to openly deride the efforts of those who work for social and intellectual betterment on the grounds that this is against the welfare of the race, is cacogenic. I do not believe that this point of view can be held any longer. . . . But it is quite possible that feeble-mindedness may result from hurt germ plasm, that in a large sense environmental forces and hereditary forces are merely names for external forces and inner forces which are not independent. It is a bit presumptuous to think that the tiny germ plasm is walled off and independent of the cosmos or even independent of forces which human beings can control. It is not incredible that what each individual experiences may have some value in determining the normal potentiality of his germ plasm. That experience will involve the kind of food he gets, the kind of infection he meets, the kind of air he breathes, and the amount of sunshine he receives, as well as those more subtle but equally potent matters, which we call psychological. Each individual is born different by virtue of his germ plasm peculiarities; how these will express themselves, nay even whether they will express themselves at all, depends upon the environment. This is true of the height, weight, and physical strength; it is even more true in that plastic organization of qualities we call personality.

## 2. THE PHYSICAL BASIS OF PERSONALITY <sup>6</sup>

*Charles R. Stockard*

The recognition of the personality changes resulting from modifications in the gonadal secretions serves to impress us with the fact that more or less marked responses to other chemical changes and varying hormonal relations are constantly arising within the body during the growth and development of the postnatal animal. Great variations in the size and functional activity of the glands of internal secretion are well known even among closely related individuals. Partly on account of these variations on the growth-affecting centers, which are largely expressions of genetic backgrounds, it is a rare sight indeed to find every member of a family growing exactly alike. It is in general also true that the more mixed the race and the more artificial the environment, the more pronounced are the variations in the endocrine glands and the more varied the population becomes.

It is well known that certain races among men and other mammals tend to be short and small, while others are tall and large; some are stocky and fat, while others are thin and lean. We have the race-horse type and the draft-horse type, the beef cattle and the milk cattle, the dwarflike African pigmy and the tall coast-line Negro, the short statured Japanese and the tall races

<sup>6</sup> From Charles R. Stockard, *The Physical Basis of Personality*. New York: W. W. Norton & Company, Inc., 1931, pp. 213-216; 302-305.

of China. These racial states are probably related in most cases to genetic tendencies for the determination of a given constitutional balance, or, as Sir Arthur Keith has suggested, to a given endocrine complex. We also find in great abundance individual variations in personalities. The thin Jack Spratt who could eat no fat and his buxom wife who could eat no lean are old acquaintances of ours.

All of these different personalities are normal variations in so far as they constitute the community population. Persons are accepted by the community and graded by their friends as lazy or industrious, stupid or intelligent, ugly or beautiful, melancholy or happy, serious or frivolous, good or bad, honest or rascally; and, to the casual mind, there the matter begins and there it ends. But we know from all that has gone before that these attributes do not begin in the adult and, furthermore, that they need not in all cases remain there. There must be a cause for each of the contrasted states. Genetic backgrounds tend toward certain of them, and in all the developmental expression and the growth balance of the individual play a determining role.

We might boldly state that almost any one of us could from time to time embrace all of the contrasted characters mentioned in the previous paragraph. We usually make too little use of ourselves as a specimen in analyzing the reactions of others. I may be lazy and unable to drive myself even to a pleasant task; I wonder at the cause and find that I may have a disturbed digestion, or have had too little sleep and am slightly out of industrious condition. A perpetually lazy man is an unbalanced man and we might discover his handicap, even though it be impossible to remove. Wild animals are not lazy unless actually unwell or constitutionally distorted, and in the latter case we term the condition the "nature of the brute." When a commonly industrious man becomes lazy he has a constitutional disturbance. Stupidity and intelligence may often be alternating states of the same mind.

When a person has been without sleep for several days, or is ill and exhausted, his mental reaction may be decidedly stupid. He may be unable to reason logically or fairly. Yet on restoring a wholesome condition this same mind may function with high intelligence. Doubtless many men are stupid on account of some chronic nervous irritation which if removed might decidedly elevate their mental level. Bad food frequently induces awkward thinking.

Ugliness and beauty are frequently observed in the same individual under different physiological states. Any chronic disease may mar the beauty of the fair. As the Germans express it, *Schönheit bedeutet Gesundheit*, beauty indicates health. The melancholy man may become happy and the happy man may become melancholy, the serious may become frivolous or the frivolous serious, as the results of changes in their relation to their environments which tend to alter the physiological states of their constitutions. If we understand what makes a happy person temporarily melancholy, we may surmise something of the state which induces permanent melancholia in another individual.

Goodness and badness, honesty and dishonesty, in common parlance, may, in certain cases at least, result from differences in functional state.

Although the above point of view might be admitted as correct in some cases, it must be remembered that it is not at all applicable in many others. There are of course definite defects and distortions in certain individuals which cannot be altered. Stupidity and ugly appearance may be of genetic origin and permanent; or similar conditions may have resulted from developmental arrests and are, therefore, congenital and cannot be removed. It becomes a duty of the student of personality to be able to differentiate the types of causes for abnormal conditions, and on this basis to prognosticate the possibilities of establishing the normal state. . . .

All the great class of mammals is in some ways similar to us, and every observer of them is frequently attracted by structural or functional expressions much like his own. It is widely recognized that the different races of the human species, the white, the yellow, and the black, show in general unlike racial personalities. And within the white and yellow race there are well-known nationalistic differences in personality. An Englishman, a German, and a Frenchman are more different in physical appearance and in their personalities than three Englishmen would ordinarily be. Finally within the same national group, and within the same community, and actually within the same family, all members show distinct personalities. The point is, that the differences between the personalities in a family are as truly dependent upon physically different backgrounds as are the larger diversities among the personalities shown by members of the various animal classes.

We have followed in the foregoing pages the details in the origin of physical constitution upon which characteristic personality depends. For each individual a definite hereditary composition is formed by the union of an egg and a male sperm cell at fertilization. This composition is not the same for a number of individuals, but is in the minutiae of its detail unique for each individual.

The physical basis of the individual, the fertilized egg, has within itself the potentiality which gives rise to the completed personality. In order to develop this personality, however, a long series of interactions between the original basis and the surrounding environment is essential. We have attempted to consider something of the manifold variations and deviations which arise from the interactions between the germinal basis and the developmental environments. And we have found that the influences of the surrounding elements are important factors in determining the nature and success of the final personality. There is no question here of the degree of importance between the genetic background and the developmental environment; neither is sufficient without the other. Without genetic basis there is no individual, and without a suitably arranged complexity of environment the complete genetic basis is unable to produce the normal individual. The interaction between the individual and the environment is continuous from the germinal beginning to the end of life, and it is mutual: each modifies and affects the

other. The individual and the environment are not separate; they are parts of a larger arrangement.

We have found that during both prenatal and postnatal development, peculiar stuffs are produced within the individual which tend to characterize its internal environment. The production and action of these stuffs seem to vary for different genetic constitutions, as is indicated by peculiar hereditary growth-responses which are secondarily dependent upon internal secretions. Our experiments on the inheritance of various peculiar structures and types among dog breeds aim at an analysis of these important reactions.

The presence of exaggerated differences among human personalities has led us to an examination of normal personalities, in order to determine whether minor differences among people could be in any way classified and explained. This examination of normal persons seems to show that there are qualitatively different types of personalities resulting from two different patterns of growth reaction. These have been termed the linear or long-headed type, and the lateral or wide-headed type. The first is apparently the older human pattern, all prehistoric remains showing long-type skulls and the manlike apes being long-headed. The lateral type with wide skull is the more recent and may possibly have arisen as a response to central continental environments acting upon man as he migrated inland from his place of probable origin on the coastal plains. This supposition is partially suggested by the probability that the maritime environments tend to give a higher functional thyroid reaction and the linear type of growth which is in general associated with an active thyroid gland. In the central continental environments, colloidal goiter and thyroid disturbance frequently occur, and in general the thyroid gland is physiologically less active and the person develops the lateral and more rounded type. These two human types exist among both savage and civilized men, and among all races, and have long been recognized by anthropologists. However, an analysis of the genetic basis for their differences and a study of their developmental reactions has not yet been accomplished.

There are many variations in both types, and there are numerous type hybrids and blends. In spite of these, a careful investigation of human personalities from the physical basis will doubtless reveal many valuable facts and enable us far better to analyze and understand individual traits and behaviors. In Herbert Spencer's words, "The equilibrations of those nervous actions which constitute what we know as mental life may be classified in like manner with those which constitute what we distinguish as bodily life. We may deal with them in the same order." Surely an understanding of this relation between form and behavior will be of vast importance to the psychologist, to the physician, and to all people as members of a community who must respond to the personalities about them.



3. CULTURE AND PERSONALITY <sup>7</sup>*Margaret Mead*

Cultural anthropologists have been concerned with the influence of the social environment and the cultural pattern in the foundation and development of the personality. The study of primitive society from this point of view has thrown considerable light upon problems of personality and is very helpful in the study of present day society. The work of Margaret Mead, in particular, has been very influential in demonstrating the part which the culture of a people plays in the establishment of certain types of personality.

Within the last five years a new impetus to the study of primitive society in relation to the problems of personality has been given by the work of Ruth Benedict, who has developed the point of view that cultural choices are to be interpreted as individual choices are interpreted, on the basis of characteristic configurations, related sets of attitudes which have an internal consistency. Culture in the final analysis draws its inspiration from the personality sets of some members of the human race. Historical anthropology had concerned itself during the past thirty years with gathering a great body of data to prove the interrelations of the cultures of a geographical area, the small contribution which any one culture has made, and the degree of its dependence upon the main stream of tradition. Differences between great areas such as North America, Oceania, and Africa were defined and illustrated. The varying fate of an institution or belief, as it was diffused from one tribe to another, was documented by a great many detailed studies. In the course of this painstaking and detailed ethnographic research certain facts emerged. It was seen that, despite their enormous dependence and interrelatedness, the culture of one small region, often the culture of one tribe of only a few hundred individuals, had a definite individuality which was sufficient to stamp as its own borrowed or shared institutions. Throughout this period of historical reconstruction, in anthropological literature, the attention of the anthropologist was, however, periodically caught, and his interpretative premises made it difficult to him to explain two facts, viz., "cultural resistance or the way in which some cultures refused a widespread trait and cultural reinterpretation. His institutional emphasis made him sometimes see the first more vividly than the second; when the distribution of culture traits was being plotted, he saw more sharply the problem of the absence of the mother-in-law tabu among the Zuni (while it was in full force among the neighboring Navajo) than he did the different reasons for which the Sun Dance was danced in different Plains tribes, as a votive offering or for success in war or to obtain a vision. The second phenomenon was facily explained by the more rapid diffusion of the external paraphernalia of ceremonialism and the more restricted localization of the esoteric content of a ceremony. The primary fact he did not attempt

<sup>7</sup> From Margaret Mead, "The Use of Primitive Material in the Study of Personality." *Character and Personality*, 3, pp. 7-10; 14-15. Published by Duke University Press.

to explain was cultural resistance. Dr. Benedict's approach makes it possible to consider reasons for this phenomenon.\* She shows how the selections from a common stock of cultural ideas, made by the different peoples of the Southwest of the United States, can be explained by referring them to two contrasting emphases within the cultures of the Zuni and Pima particularly. These contrasting emphases she called Apolonian and Dionysian, referring the Zuni refusal to make any use of the widespread American phenomenon of the individual vision, their ordered treatment of the dead, with all the emphasis upon making the mourners painlessly forget their loss; the Zuni resistance to the use of peyote in inducing religious experience and later refusal of alcohol, to the development in Zuni of a cultural personality which valued an evenly ordered way of life and did not value violence and excess. This thesis is further demonstrated with comparable documentation of the violent mourning, self-torture and excess permitted on the Plains, and the premium set upon excess among the Pima of the Southwest. In these first papers Dr. Benedict advanced the hypotheses that cultures and the use which they made of the traditional matter which was the common stock of a widespread area could be interpreted as we interpret the choices of an individual personality; that cultures had definite configurative sets which acted selectively and creatively in accepting, rejecting, or remodeling ideas and institutions. The first formulation of this approach has now been followed by a book, *Patterns of Culture*,† in which Dr. Benedict selects three primitive societies, Zuni, the Kwakwilt of Vancouver Island, and the Dobuans of British New Guinea, and delineates the personalities of these cultures, with extensive references to their institutions and beliefs. Dr. Benedict's main interest has been cultural; she has used such concepts of personality as we possessed without an attempt to build a system or to choose classifications of personality which would fall within any one scheme. Zuni she discussed as Apolonian; the Kwakwilt as the exaltation of the ego so familiar in studies of megalomania, the ego with an overdeveloped capacity to see insult, which is inflated far beyond its ability to maintain its position, and collapses into sulks or suicide if it meets with failure. In her discussion of Dobu, Dr. Benedict has elaborated Dr. Fortune's original description‡ of the culture as paranoid, chiefly concerned with building up enemy constructs and then symbolically battling against these figments of hate and destruction. This book opens up a whole new line of approach to the use of primitive material.

It may be well to say a word in regard to the way in which Dr. Benedict's approach differs from Spengler's.§ She is not concerned with identifying ideas, basic ideational sets which have characterized a culture or a period, but with a more direct and immediate analogy between the variations in human per-

\* Ruth Benedict, *Psychological Types in the Cultures of the Southwest* (Twenty-third International Congress of Americanists, 1928), pp. 572-581; "Configurations of Culture in North America," *American Anthropologist*, 34, n.s. 1-27 (1932).

† Ruth Benedict, *Patterns of Culture* (Boston: Houghton Mifflin Company, 1934).

‡ R. F. Fortune, *Sorcerers of Dobu* (London: George Routledge and Sons, 1932).

§ Oswald Spengler, *Types of Men* (Halle, Pigors, 1928). English translation by J. W. Paul.

sonality and the variations between cultures which she discusses as embodying now one, now another of these human sets.

The student of personality is concerned, however, not with the explanation of how cultures are formed, but with the implications of culture for personality formation. This point Dr. Benedict originally discussed in an article on "Culture and the Abnormal,"\* in which she stresses the fact that according as a culture emphasizes now one, now another of these contrasting and conflicting personality sets, it will be able to use certain of the individuals born within its bounds, and must disallow, and even drive to insanity, other individuals whose basic sets are too extreme to permit them to fit into the pattern. Such a point of view does not contravene the basic anthropological assumption that human nature is extraordinarily malleable and that every society succeeds in shaping most of the individuals born within it to its particular drives and emphases. But it does insist that no culture uses all of the potentialities of those born within its bounds. Those individuals whose basic sets contrast most strongly with the types of personality approved by the culture will constitute the abnormal, although the abnormal may be the man who trusts his neighbors in Dobu, the man who does not care for a great accumulation of property in Manus, the individual who wishes to possess exclusively and un-co-operatively his land and the fruit of his toil among the Arapesh, the individual who wishes to care greatly for another in Samoa, the man or woman who takes a delight in children and in rearing them in Mundugumor. Correspondingly, among those who are classified as abnormal among ourselves, the mystic would have been a successful visionary on the plains, or the epileptic would have been a shaman in Siberia or among the Amazulu. . . .

To make a description of a culture finally meaningful for an investigation which has for its end greater knowledge about the problem of personality, it is not sufficient to have a flat, two-dimensional picture of the culture as it appears in standardized adult behavior. To be content with such a procedure is as if a physician were satisfied with a record of the patient's behavior during a few weeks of his life, but had no interest in the process by which he became what he is now seen to be. It is not enough to describe, from institutionalized statement and carefully documented examples of individual behavior, what is the pattern of a society, but one must know also, and in detail, what mechanisms that society uses to produce the finished adult personality. If as in Samoa, the standard adult picture is of a grave and graceful personality, one which measures all things carefully and expends little emotion on any one of them, one which is concerned with the ordering of social life and profoundly uninterested in any form of individual experience, one which discredits haste or undue precocity, then we must know by what means the society molds each generation into such a pattern, what types of individuals it finds most intractable, what devices it employs to discourage the precocious

\* *The Journal of General Psychology*, 10, 59-82, 1934.

and mute the energy and enterprise of the overaggressive.\* In the course of investigations such as this, which are essential to a final understanding of the adult culture, we can also test out the various theories of childhood experience as definitive in the formation of personality. The restless aggressive urge of a Manus man to get ahead, to attain economic security, to throw off his obligation of co-operating with an older relative, can only be understood thoroughly if we know of the uncontrolled social life which Manus children lead, the free rein which is given to their aggressiveness, the amount of security and self-confidence which they are permitted to develop, only to have it all suddenly taken away from them at marriage.† Only by a record of the whole life span of the individual, and especially of the methods of education, formal and informal, can the adult personality be understood.

Furthermore, it is not sufficient to describe the approved type, the average or ideal man in each primitive community, by describing the educational system which has formed him, and the institutional attitudes to which he conforms. It is necessary to define further this ideal type, this personality towards the development of which all the institutions of the community are focused, by a discussion of the deviants, those who fall short, those who will not or cannot conform to the pattern. The absence of any premium upon religious experience in present-day America is defined as much by the fate of the mystic as by the description of the man in the street. And because of the greater homogeneity, the narrower channeling of personality in primitive societies, this is even more true there. The pattern itself is never defined unless the deviants are also described, and that adequately. Then we find among the mountain Arapesh—who emphasize a co-operative spirit with slight interest in ownership as such, and a responsive, trustful attitude towards their neighbors—individuals whose attitudes would present no problems in Manus; others who would have been normal, well-adjusted Dobuans, are hopelessly at a loss, quarreling with their neighbors, suspecting others, beating their wives; they are maladjusted individuals in a society which emphasizes traits too foreign to their own individual sets.

#### 4. SEX DIFFERENCES IN PERSONALITY<sup>8</sup>

Margaret Mead

In the reading given above from Dr. Myerson the question was raised as to the causation of the different personalities of men and women—whether the difference depends upon the biological differences between the sexes or upon cultural ones. Miss Mead, as a result of her intensive researches among primitive peoples, advances the thesis that the differences in the personalities of the sexes are due to cultural influence and discusses the bearing of this theory upon social planning and education.

\* M. Mead, *Coming of Age in Samoa* (New York: William Morrow, 1928).

† M. Mead, *Growing Up in New Guinea* (New York: William Morrow, 1930).

<sup>8</sup> From *Sex and Temperament*, by Margaret Mead. William Morrow & Company, Inc., copyright 1935, pp. 310-312; 314-316.

The knowledge that the personalities of the two sexes are socially produced is congenial to every programme that looks forward towards a planned order of society. It is a two-edged sword that can be used to hew a more flexible, more varied society than the human race has ever built, or merely to cut a narrow path down which one sex or both sexes will be forced to march, regimented, looking neither to the right nor to the left. It makes possible a Fascist programme of education in which women are forced back into a mold that modern Europe had fatuously believed to be broken forever. It makes possible a Communist programme in which the two sexes are treated as nearly alike as their different physiological functions permit. Because it is social conditioning that is determinative, it has been possible for America, without conscious plan but none the less surely, partially to reverse the European tradition of male dominance, and to breed a generation of women who model their lives on the pattern of their schoolteachers and their aggressive, directive mothers. Their brothers stumble about in a vain attempt to preserve the myth of male dominance in a society in which the girls have come to consider dominance their natural right. As one fourteen-year-old girl said in commenting on the meaning of the term "tomboy," "Yes, it's true that it used to mean a girl who tried to act like a boy, dress like a boy, and things like that. But that belonged to the hoop-skirt era. Nowadays all girls have to do is to act exactly like boys, quite quietly." The tradition in this country has been changing so rapidly that the term "sissy," which ten years ago meant a boy who showed personality traits regarded as feminine, can now be applied with scathing emphasis by one girl to another, or can be defined by a small girl as "the kind of boy who always wears a baseball glove and goes about shouting, 'Put her there! Put her there!' and when you throw him a soft one he can't catch it." These penetrating comments are sharply indicative of a trend that lacks the concerted planning behind Fascist or Communist programmes, but which has nevertheless gained in acceleration in the last three decades. Plans that regiment women as homemakers, or which cease to differentiate the training of the two sexes, have at least the virtue of being clear and unambiguous. The present development in this country has all the insidious ambiguity of the situation that we found illustrated among the Tchambuli head-hunters, where the man is still defined as the head of the house, although the woman is trained to a greater celerity and sureness in taking that position. The result is an increasing number of American men who feel they must shout in order to maintain their vulnerable positions, and an increasing number of American women who clutch unhappily at a dominance that their society has granted them—but without giving them a charter of rules and regulations by which they can achieve it without damage to themselves, their husbands, and their children.

There are at least three courses open to a society that has realized the extent to which male and female personality are socially produced. Two of these courses have been tried before, over and over again, at different times in the long, irregular, repetitious history of the race. The first is to standardize

the personality of men and women as clearly contrasting, complementary, and antithetical, and to make every institution in the society congruent with this standardization. If the society declared that woman's sole function was motherhood and the teaching and care of young children, it could so arrange matters that every woman who was not physiologically debarred should become a mother and be supported in the exercise of this function. . . . It could abolish the discrepancy between training women for marriage and then forcing them to become the spinster supports of their parents.

Such a system would be wasteful of the gifts of many women who could exercise other functions far better than their ability to bear children in an already overpopulated world. It would be wasteful of the gifts of many men who could exercise their special personality gifts far better in the home than in the market place. It would be wasteful, but it would be clear. It could attempt to guarantee to each individual the role for which society insisted upon training him or her, and such a system would penalize only those individuals who, in spite of all the training, did not display the approved personalities. There are millions of persons who would gladly return to such a standardized method of treating the relationship between the sexes, and we must bear in mind the possibility that the greater opportunities open in the twentieth century to women may be quite withdrawn, and that we may return to a strict regimentation of women. . . .

So in our own society. To insist that there are no sex differences in a society that has always believed in them and depended upon them may be as subtle a form of standardizing personality as to insist that there are many sex differences. This is particularly so in a changing tradition, when a group in control is attempting to develop a new social personality, as is the case today in many European countries. Take, for instance, the current assumption that women are more opposed to war than men, that any outspoken approval of war is more horrible, more revolting, in women than in men. Behind this assumption women can work for peace without encountering social criticism in communities that would immediately criticize their brothers or husbands if they took a similarly active part in peace propaganda. This belief that women are naturally more interested in peace is undoubtedly artificial, part of the whole mythology that considers women to be gentler than men. But in contrast let us consider the possibility of a powerful minority that wished to turn a whole society whole-heartedly towards war. One way of doing this would be to insist that women's motives, women's interests, were identical with men's, that women should take as bloodthirsty a delight in preparing for war as ever men do. The insistence upon the opposite point of view, that the woman as a mother prevails over the woman as a citizen at least puts a slight drag upon agitation for war, prevents a blanket enthusiasm for war from being thrust upon the entire younger generation. The same kind of result follows if the clergy are professionally committed to a belief in peace. The relative bellicosity of different individual clerics may be either offended or gratified by the prescribed pacific role, but a certain protest, a cer-

tain dissenting note, will be sounded in society. The dangerous standardization of attitudes that disallows every type of deviation is greatly reinforced if neither age nor sex nor religious belief is regarded as automatically predisposing certain individuals to hold minority attitudes. The removal of all legal and economic barriers against women's participating in the world on an equal footing with men may be in itself a standardizing move towards the wholesale stamping out of the diversity of attitudes that is such a dearly bought product of civilization.

Such a standardized society, in which men, women, children, priests, and soldiers were all trained to an undifferentiated and coherent set of values, must of necessity create the kind of deviant that we found among the Arapesh and the Mundugumor, the individual who, regardless of sex or occupation, rebels because he is temperamentally unable to accept the one-sided emphasis of his culture. The individuals who were specifically unadjusted in terms of their psychosexual role would, it is true, vanish, but with them would vanish the knowledge that there is more than one set of possible values.

#### IV. Educational Problems

##### I. PERSONALITY AND MENTAL HYGIENE <sup>9</sup>

*William H. Burnham*

A number of practical problems in regard to the actual practice of mental hygiene today in the schools may well be considered. Some of them are as follows:

(1) The primary aim of mental hygiene is the preservation and development of a wholesome personality and the prevention of personality disorders. How far is this true of education? How far is it true of practice in the school-room?

(2) Hygiene requires respect for the personality of each pupil as a unique and independent individual—an object for observation and study, but never for snap judgments. Does education emphasize this in the same way? How far do teachers follow the same rule in practice? Similar questions may be asked after each of the following statements.

(3) Hygiene requires regard for the whole personality as an integrated unit, the whole child as shown in its interests and behavior, in home, playground, and the like, as well as in the school.

(4) For the preservation and development of a wholesome integrated personality hygiene requires a task of his own for each pupil and the maximum of freedom in the choice and doing of the task.

(5) Hygiene requires the adjustment of the task to the personality and stage of development of each pupil, so that each may receive the stimulus of success.

<sup>9</sup> From William H. Burnham, *The Wholesome Personality*. New York: D. Appleton-Century Company, 1932, pp. 476-478.

(6) Hygienic activity is attentive activity, for attention is integration. In many schools with methods now used, the usual complaint [of inattention by teachers] suggests that much of the work is not hygienic.

(7) Hygiene requires the avoidance of conditions disintegrating and confusing in the instruction and training, especially harsh criticism, sarcasm, blame, and anything that reflects upon the personality of the pupil, such as words and actions that call attention to personal defect or inferiority.

(8) Hygiene emphasizes the health value of the objective or scientific attitude, or, in educational terms, the learning attitude in its highest form; thus emphasizing truth rather than opinion, learning rather than teaching, and the value of training in the scientific attitude in all school activity.

(9) Hygienic activity is carried on at the rhythm and rate of speed natural to the individual. The child's nervous system is adapted to relatively slow responses. An artificial haste is unhygienic. How far do the schools regard this hygienic rule today?

(10) Hygienic conduct is obedient conduct. It does not, however, follow that disobedience is always unhygienic. The teacher without knowledge of hygiene, for example, may require conduct impossible for the pupil at the given stage of the individual's development. How far does school practice conform to the genetic method?

(11) Hygienic conduct has a wholesome relation to the social group of which the child is a member—home, playground, school groups, and the like. Each of these may be a normal democratic group, in which each member has opportunity to contribute something to the welfare of the group. How far are they democratic?

(12) Mental hygiene teaches the avoidance of error, artificial mechanisms—prejudices, deceptive customs by which one deceives teachers and the social group, and the conceit of knowledge, by which one deceives oneself. How far are these avoided in the schoolroom?

## 2. PRESCHOOL EDUCATION<sup>10</sup>

*Douglas A. Thom*

If a generation of children were permitted to enjoy during the preschool years, an environment which fulfilled their physical, intellectual and emotional needs as outlined and as expressed in the proposed plan for preschool education, there is reason to believe that they well might attain a greater sense of security in all personal relationships resulting in a harmonious adjustment with parents, contemporaries, and those in authority. They would acquire confidence in self as a result of personal achievement, and adequate recognition, and something very much worth while and far-reaching would be accomplished. Such a group would find a happier and more efficient adjustment to the demands of life and relatively less conflict with society in general.

<sup>10</sup> From Douglas A. Thom, "The Psychiatric Implications of Preschool Education." *The American Journal of Psychiatry*, 92, No. 4, pp. 834-835.



Dr. James Plant recently made the statement that "There seems to be evidence that maladjustment and delinquency are as rampant as ever and that we have no certain technique for their prevention and control." No one who faces the problem frankly will be in disagreement with Dr. Plant though it may be looked upon as a rather sad commentary on the contribution which psychiatry proposed to make to the solution of these important social problems.

It occurs to me that preschool education has already embodied into its curriculum many of the fundamental principles of mental hygiene and this has been done in relation to the child in such a way and at such a time that this broader concept of education stands in a unique position to serve well the needs of a vast army of preschool children. I know of no other institution with the possible exception of the home that has a more important contribution to make.

The psychiatric implications can only be understood and appreciated when we take into consideration the importance of the preschool years in terms of establishing a foundation for mental health, keeping in mind that mental health is something more than being free from mental disease. Mental health in its broadest sense represents a state of mind that permits the individual to approach his maximum efficiency, attain the greatest amount of happiness and satisfaction out of life and do these things with a minimum amount of friction. Life is one continuous series of choices and adjustments. Conflict and friction over making these adjustments invariably lead to varying degrees of emotional instability. Preschool education stands in a position to make a real contribution to both parents and children. Psychiatry will do well to co-operate and encourage the preschool movement not only contributing what it can toward its further development, but to be receptive to the opportunities which this new venture in education may add to the field of mental hygiene.

### 3. THE PERSONALITY OF THE ADOLESCENT<sup>11</sup>

*Fowler D. Brooks*

*Trait consistency an element in integration.*—While the organization of traits seems to consist largely in their relative strength, yet it also includes the establishment of such permanence or regularity of this relative strength as gives a certain consistency to conduct, and prevents any rapid shift from one quality to its opposite. A well-integrated personality shows a reasonably high degree of trait consistence, or at least an absence of frequent alternations of contrary traits in essentially similar transactions.

*Adolescent inconsistency.*—The adolescent boy or girl usually does not possess that fixity and steadiness of character just mentioned. In many respects he has been well habituated in routine, but many of his traits are not so stable because he is still immature. Herein lie the possibilities of his developing a better personality. He often shows many contradictory traits in confusing suc-

<sup>11</sup> From Fowler D. Brooks, *The Psychology of Adolescence*. Boston: Houghton Mifflin Company, 1929, pp. 418-419.

cession. He may be joyous and cheerful, unselfish, kind, or generous on one occasion, and be quite the reverse almost immediately thereafter. His conflicting impulses may show at times in inconsistent conduct responses. Of course the traits shown depend in part upon the situations evoking them, but even under essentially similar outer circumstances the youth may show widely divergent responses.

Parents and teachers need not be dismayed if the youth seems at times to be a veritable bundle of contradictions. Many impulses are pushing him along, some of these are contradictory, some (e.g., sex) are much stronger than ever before, and many of them have not yet been fully understood and placed in their proper relation to the others. As he revamps his outlook upon life during the teens, and has further wise guidance and control, he will come to inhibit some of the conflicting impulses and develop a more satisfactory, consistent working basis for his powers.

#### 4. THE PROBLEM OF PERSONALITY IN HIGH SCHOOL AND COLLEGE<sup>12</sup>

*William F. Ogburn*

The problem of personality is being forced on the colleges and high schools because of the botch which cities and factories of modern civilization have made of ethical and training values. The personality difficulties facing the public school children of New York City today hardly bothered the schools in the villages of a generation ago, where the home and the church were relatively stronger in their influence. The scope of the influence of the home and church over children is greatly reduced over the young in our large cities. Hence the pressure for the schools to carry the burden.

Personality was once divided primarily into the two categories of "good" and "bad." Now, as a result of the growth of psychiatry and abnormal psychology, the dichotomy is that of "normal" and "abnormal." Thus, the ideas of nervousness, of mental disorders, of strains, of peculiarities and eccentricities, all these are now considered most important aspects of personality, as truly as the traits "good" and "bad." I have always been very greatly impressed with some conclusions which I made some years ago with regard to the frequency in society of abnormal personalities. It was shown, in New York State and in Massachusetts, that of the boys and girls of high school age about one in twenty would actually be in an insane asylum sometime during the course of their lives.

As a sociologist I see these issues as against the shifting of functions among our social institutions. At any one time the business of society is cared for by a certain set of institutions, government, industry, the family, the church, and the community. As time goes on, one of these institutions will lose some of its functions which will be taken up by another; for instance, the family today has lost many of its functions with regard to protecting the individual mem-

<sup>12</sup> From William F. Ogburn, "Nonintellectual Aspects of Personality Facing Education," *Educational Record*, 16, No. 3 pp. 294-295; 299.

bers of the family. These functions have been assumed by the state through the police and through measures of economic security such as old-age pensions. A function once exercised by the family is now taken over by the state. . . .

The colleges and high schools of the United States will see this problem much more acutely in the future than it is now. You have seen the handwriting on the wall when you witness the conflict between the Fascists and the Roman Catholic Church in Italy over the training of youth. You see an indication of what is to come when you notice the zealousness with which the Russians guard the teaching of their youth from the point of view of Communism, and the concern with which the Nazis in Germany are interested in inculcating their doctrine in the youth.

The indoctrination of such a social religion in youth takes because the scientific instruction in the social sciences, however excellent it may be for the thinking processes, and for science, is most inadequate in meeting the needs of personality which a social religion does much better. As a teacher of social science I should be very much interested in seeing religious fervor in another field than social science. I should be very much interested if courses in art, or if extracurricular activities could meet this need of the personality, so that we might be left free to deal with social science scientifically. But I fear some kind of social religion will soon be on us. The reason will be because the personality needs it.

#### 5. THE PERSONALITY OF THE TEACHER<sup>13</sup>

*L. F. Shaffer*

The quality of the school's influence for mental hygiene is determined in no small measure by the personal characteristics of its teachers. The attitudes and habits of adjustment that the pupil learns depend more on the social relationships of the classroom than on the more academic aspects of education. Consequently, a teacher whose traits of personality call forth unfavorable reactions from the students can wreck the best-planned curricular provisions for mental health. Some teachers are overaggressive in their actions toward pupils, bullying them, looking for small infractions of the rules, and constantly asserting their own mastery and superiority, often by sarcastic and critical comments. Other teachers show a lack of emotional balance, being inconsistent in their treatment of pupils, flying into a rage at misdemeanors, or displaying "nervousness" and excessive sensitivity to the difficulties of the classroom. On the other hand, there are teachers who appeal to the class for sympathy, who try to win approval by granting special favors, or who shower affection on one or a few pupils while neglecting the rest of the class. All of these forms of teacher behavior are destructive of good adjustment for the students.

It is easy to take a moralistic attitude toward teachers who commit these offenses against mental hygiene, and to advocate their dismissal. But it must be remembered that teachers are human beings and, like all others, have their

<sup>13</sup> From L. F. Shaffer, *The Psychology of Adjustment*. Boston: Houghton Mifflin Company, 1936, pp. 512-515.

own problems of adjustment. Teachers who have unfortunate characteristics of personality are not merely ignorant or perverse, but are suffering from maladjustment.

Many adjustive difficulties of teachers arise from common causes. They suffer the same frustrations of motives as do other people, and may be unable to adjust constructively because of inadequate habits or developmental defects acquired earlier in life. In addition to the more general causes of maladjustment the teaching profession provides some special situations that make it hard for teachers to remain well balanced. It is admittedly a difficult and fatiguing task to deal with forty lively youngsters all day in a classroom. Teachers are often poorly prepared for their work, which creates a need for them to be on the defensive. The low salaries and unesteemed status of teachers also contribute to an attitude of inferiority. Unmarried teachers away from home frequently live in rooming houses and do not have the integrating influence of home life and of social outlets. The sexual maladjustments of unmarried teachers, often thoroughly repressed and unrecognized, undoubtedly make for nervousness and other persistent nonadjustive reactions.

The psychology of adjustment makes clear the relationship between the frustrations of teachers and their typical undesirable classroom habits. Over-aggressive behavior and the assertion of mastery are compensatory mechanisms for overcoming an attitude of inferiority. This attitude may have been built up by the teacher's childhood or adolescent experiences, by the struggle necessary to gain an education, or may result from recent factors such as a sense of inadequacy for the task of teaching, or an unfulfilled desire to enter some other profession. The control of children in school offers an exceptional opportunity for compensatory behavior. In fact, it has even been suggested that some persons enter teaching in order to gain the motive satisfaction that results from lording it over the helpless pupils. Appeals for sympathy from the class are often the result of the emotional maldevelopment of the teacher that causes an excessive need for love and favorable attention. Persistent nonadjustive reactions result from many serious thwartings of motives for which no outlets can be found. When a teacher says that a class makes her nervous or "drives her wild," it is, of course, her inability to adjust to the situation that is the real source of the emotional response.

Most of the personality handicaps of teachers are remediable. First, all teachers should make a critical analysis of their own behavior from the point of view of mental hygiene. The motives underlying the teacher's methods of handling pupils should be clearly recognized, and modifications made if needed. The teacher should ask, "Am I just gratifying my own drives, or am I directing the school activities objectively, for the benefit of the pupils themselves?" Improvement in competence assists in maintaining an adjustive attitude, for the teacher who is sure of her subject matter and methods will have less need to act defensively. Principals and supervisors have as great a responsibility for the personalities of teachers as for their methods of instruction. Reprimands and orders are no more effective for a maladjusted teacher than

for a maladjusted pupil, but a cordial relationship between teacher and supervisor and the making of tactful and psychologically considered suggestions can do much to assist the teacher in working out her own problems. The provision of psychiatric service for teachers in connection with the school health department can, if skillfully administered, turn some teachers from liabilities into educational assets. Even with the best of facilities for mental health, however, there will remain a few teachers so hopelessly handicapped in personal adjustment that they can be nothing but a menace to their pupils. Since the mental health of a generation of children is more important than is the vocational advantage of one teacher, these individuals must be guided into another occupation for which they may be less poorly adapted.

The teacher of the future must be as much a specialist in mental hygiene as in subject matter or method. Increasing recognition is being given in schools of education to the importance of mental hygiene in the curriculum for prospective teachers. While an intelligent and informed attitude toward problems of personality and behavior will do much good, it is not sufficient. Teachers must be exceptionally well-adjusted persons themselves. This end can be accomplished in part by selection and in part by clinical service. Some candidates for the teaching profession should be debarred because of a lack of good adjustment, no matter what their other accomplishments.

A psychiatric examination should be as important in the selection of teachers as are the physical examinations and educational attainments now required. Well-administered vocational guidance can eliminate many misfits among prospective teachers, for few persons wish to enter an occupation for which they know themselves to be poorly qualified. Mental hygiene clinical service for teachers in training can remedy some of the less fixed defects of personality. Selective methods alone are not enough, however, for some persons who were well adjusted when they entered the profession may become maladjusted later. Teachers must be educated to make use of mental hygiene facilities that should be provided for them. By these various means teachers can be supplied who are adequate not only in scholarship and intelligence but also in emotional balance, adaptability, and integration.

## 6. SOME QUALIFICATIONS FOR A GOOD JUDGE OF PERSONALITY<sup>14</sup>

*Gordon W. Allport*

Who is the best judge of personality? This question has deep epistemological roots, for its answer depends upon the source and nature of our knowledge of other minds. If we accept without debate the empirical postulate that all knowledge originates in concrete sensory experience, it is then possible to formulate four qualifications for a good judge of men. A different theory of knowledge, to be sure, would result in different deductions.

From the empirical point of view it is above all necessary that the judge's

<sup>14</sup> From Gordon W. Allport, "Some Guiding Principles in Understanding Personality," *The Family*, 11, p. 127.

experience with human nature be broad and long-continued. Common sense clearly endorses this deduction. A second consequence of our postulate states that we understand best those who are most like ourselves, or at least those whose experience in life resembles our own. This principle too agrees with our common observation that sympathy and mutual understanding spring up between like-minded people. A third principle states that persons ordinarily cannot comprehend others who are more complex or more subtle than they. As evidence for this principle one might point out that successful psychiatrists are not often simple and extroverted in their own personalities, and that it was Faust and not his famulus Wagner who was capable of understanding the complexities of the human soul.

The fourth qualification accounts for certain exceptions to the first three principles and also for the special giftedness of the keenest judges. This qualification is that of the artistic attitude. This artistic attitude seems to be the ability to comprehend the intrinsic harmony of an object that is for the moment the center of attention. The object may be a bit of landscape, a tapestry, a human person, or a social situation. For those who readily assume the artistic attitude, the traits and values and conflicts in a given personality automatically assemble into a single and harmonious, if exceedingly complex, structure.

The best judge of people—who, incidentally, is not necessarily the ablest social worker—then, seems to be one who has broad experience, is himself of not too simple a nature, possesses the artistic attitude, and has a mental life which resembles that of his clients. Since this final qualification by its very nature can be realized only in the relationship between the worker and certain of his clients, the first three are more universally important.

## V. The Measurement of the Personality

### THE MEASUREMENT OF PERSONALITY<sup>15</sup>

*Lewis M. Terman*

The measurement of personality is bound up with the question of psychological measurement in general. Hardly anything has so affected the aspect of experimental psychology during the last quarter century as the introduction and development of quantitative methods. Their influence on the whole has been good. The nonquantitative categories of descriptive psychology were frequently too ill-defined to be very meaningful or to offer fruitful points of departure for experimental work. More and more the descriptive approach is being abandoned in favor of procedures which are quantitative and often elaborately statistical.

It is well to remind ourselves, however, that the application of quantitative methods does not guarantee new psychological insights. Moreover, measurement enthusiasts too often lose sight of the inherent difficulties, even dan-

<sup>15</sup> From Lewis M. Terman, "The Measurement of Personality," *Science*, 80, 1934, pp. 605, 607-608.

gers, involved in the reduction of psychological data by the mathematical tools that are so indispensable in the physical sciences. Perhaps no saying of Thorndike's has been so often quoted as his statement that "whatever exists exists in some amount and can be measured." These words have been taken up by his followers and turned into a veritable battle cry in their assaults upon every psychological stronghold, including even those mysterious characteristics that go to make up what is known as "personality." . . .

The clinical approach is absolutely necessary for the interpretation of personality as a whole, for a true picture of a personality cannot be pieced together from any number of test scores. The total is an organismic, not an additive, total. Personality traits are not merely intercorrelated, but are functionally interactive in infinitely complex ways now little understood. This fact is familiar to us in the concept of compensation. The presence of inferiority feelings may give rise either to a chronic attitude of self-depreciation or, by overcompensation, to an attitude of boastfulness. Physical cowardice may give us either the typical coward or, by overcompensation, the foolhardy daredevil. The boy of naturally effeminate tastes and attitudes does not always develop into a sissy; he may cultivate the ways of the cave man and flaunt his masculinity. If one is naturally prone to form emotional prejudices, *and knows it*, one may succeed in becoming a Darwin of fair mindedness. One who is excessively introverted does not ordinarily become a good salesman or an effective leader, but by taking thought he may become either. It is one of the great weaknesses of personality tests that they cannot discriminate between behavior attitudes that are the expression of the subject's natural personality characteristics and those that have been acquired by compensation or self-discipline. Moreover, the behavioral significance of a given amount of a particular trait is never unequivocal; it is always dependent upon the other trait complexes in which it is embedded.

There appears to be a widespread opinion among psychologists that the methods of factor analysis, especially as developed by Thurstone, will prove a powerful tool in untangling the skeins that make the warp and the woof of human personality. That they can be very useful in analyzing the content of current personality tests has indeed been sufficiently demonstrated. They have shown that a large collection of personality tests which yield scores on a vast array of alleged personality "traits" may possess altogether not more than four or five distinguishable components. It is well to know this, but it is another thing to conclude that the total personality can be accounted for so simply. There must be, certainly are, many factors of personality that have not been and can never be embodied in our tests. These unknowns are always entering to upset our interpretations of test scores and to limit their usefulness when we apply them in our attempts at personality diagnosis and adjustment. There are no statistical short cuts to the understanding of human nature.

At present personality tests of children give a very slender basis for prognosis. In this they resemble the intelligence tests of a quarter century ago. At that time no one could predict from the best intelligence tests what the

later course of intellectual development was likely to be. Since then follow-up studies and retests have made it possible, within reasonable limits, to predict from the intelligence score of an eight-year-old child what the subject's adult level of intelligence will be and what educational accomplishments can be expected. No one knows whether there is any such constancy in the field of personality. It may be that compensations and other cross currents are capable of altering the entire landscape of one's personality in a few years. No one knows how serious for later life a given personality fault of childhood may be. The only way to find out is to make minute studies of the personality characteristics of large groups of young children and follow their later development into adult life.

Until longitudinal studies of this kind have been made, the school counselor and mental hygiene "expert" will be working in the dark. At present they can only guess at the prognostic significance of the personality traits they discover, whether by the use of tests or by means of clinical observations. The psychologist stands aghast at the self-assurance with which the professional school counselors in America diagnose the personality faults of little children and at the boldness with which they undertake the delicate task of adjustment. That some counselors do much good, by the mere application of common sense, will of course be admitted; that others do real harm is hardly less certain. The student of genius who is familiar with the motivating influences that have their origin in quirks of childhood personality shudders to think what the result would have been if school counselors had had a chance to "adjust" the personalities of some of the budding geniuses of history. One can imagine them, freed of all their peculiarities and complexes, adjusting to the world as it was and becoming undistinguishable from the human herd.

Some day, it is to be hoped, the psychologist will know how and when to adjust personalities; at present he knows very little about it and the professional school counselor knows even less.

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## EXERCISES

1. Select several definitions of education as stated by writers about ten years ago and contrast them with the statement quoted from Burnham in the introduction. How do you account for the difference?
2. What is the chief difference in the theories of personality of the behavioristic and Gestalt school of psychology?
3. Why is the Gestalt theory especially important for advocates of progressive education?
4. Smuts, Allport, Vernon and others believe that a new science of personality must be established. Is this necessary? Why?
5. How do you account for the fact that psychology has failed to deal adequately with the field of personality?
6. From your experience, can you verify the statement quoted by Koffka, (II, 2) from Vernon and Allport, regarding expressive movements?
7. Criticize the theory that individuals may be classified according to "types." Even though you may consider these classifications untenable and unscientific, do you see any practical value in them?
8. Criticize the use of the terms "heredity" and "environment," when used in opposition, concerning personality.
9. What bearing do the statements of Myerson and Mead have upon social and educational theory?
10. What is the physical basis of personality? Upon what does the physical constitution depend?
11. Criticize the thesis advanced by Stockard (III, 2) that "there are qualitatively different types of personalities resulting from two different patterns of growth reaction."

12. What is the educational importance of the theory advanced by Margaret Mead?
13. How can the work of the cultural anthropologists be used in testing the "various theories of childhood experience as definitive in the formation of personality"?
14. Discuss sex differences in personality.
15. Consider the various questions raised by Burnham (IV, 1).
16. What provisions can be made for personality training in (a) the preschool, (b) the elementary school, (c) the secondary school, and (d) the college?
17. Considering the practical problems raised by Burnham (IV, 1), make a critical survey of your own school experience.
18. What responsibilities regarding the personality of teachers rest upon (a) teacher-training institutions and (b) educational supervisors and administrators?
19. What is the present status of the measurement of personality?
20. Discuss the statement by Terman (V) regarding the work of professional school counselors and the attempts made by them at adjustment.

## CHAPTER XXIII<sup>1</sup>

### PERSONALITY MALADJUSTMENTS AND MENTAL HYGIENE

*H. Clay Skinner, Temple University*

#### I. Introduction

Many children and adults suffer from some degree of personality disturbance. These maladjustments range all the way from very minor and relatively unimportant disorders to the insanities. Mental and social maladjustments are a major cause of many school failures, and they also account for many of the failures in the vocational and professional pursuits. Domestic conflicts and divorces grow out of them. Chronic delinquents and criminals suffer from them. Aside from the suffering and unhappiness caused by such maladjustments, the economic cost is staggering. In fact, it constitutes a burden that runs into the billions of dollars each year.

Many maladjustments have their origin in early life. The home, the school, and the nature of our society often contribute directly or indirectly to their development. Home conflicts, economic insecurity, sharp competition in the school resulting from such unpsychological practices as the giving of marks, the offering of prizes, the use of pressure so that pupils will attain certain (often questionable) standards, the failure of students in their work, and the like—all are contributing factors to unwholesome and unhappy adjustments.

Some children are predisposed to these difficulties on account of constitutional weaknesses, yet the proper environment and associates would prevent their development. In fact, a majority of all maladjustments acquired by children and adults could have been prevented altogether. Others, if recognized at their beginning and if then given the proper medical treatment, wholesome environment, and an education fitted to the individual's needs, could have been rectified then and there.

It is the task of educators, psychologists, mental hygienists, and psychiatrists to work together for the purpose of preventing personality disorders and treating any that are found. The mental hygienist addresses himself primarily to the work of prevention; the psychiatrist, to that of treating nervous and mental ills.

#### II. The Meaning and Scientific Basis of Mental Hygiene

##### I. DEFINITION OF MENTAL HYGIENE<sup>2</sup>

*J. E. W. Wallin*

Mental hygiene represents the application of a body of hygienic information and technique, culled from the sciences of psychology, child study, educa-

<sup>1</sup> The selections in this chapter will particularly supplement the discussions in such standard textbooks as Griffith, *An Introduction to Educational Psychology*, Chapter XVIII; Skinner and Collaborators, *Educational Psychology*, Chapter XXI; Trow, *Educational Psychology*, Chapter IV; Gast and Skinner (H. C.), *Fundamentals of Educational Psychology*, Chapter XV; and Benson, *et al.*, *Psychology for Teachers*, Chapters XX and XXI.

<sup>2</sup> From J. E. W. Wallin, *Personality Maladjustments and Mental Hygiene*. New York: McGraw-Hill Book Company, Inc., 1935, p. 31.

tion, sociology, psychiatry, medicine, and biology, treating (1) the problem of the preservation and improvement of the mental health of the individual and of the community, and (2) the problem of the prevention and cure of minor and major mental diseases and defects and of mental, educational, and social maladjustments.

The suggestive definition prepared by the New York State Health Commission may be cited as a parallel or contrasting definition: "In its fullest meaning mental hygiene is directed to developing personality to its greatest possibilities, so that every individual gives his best to the world and knows the deep satisfaction of a life richly and fully lived." The objective of mental hygiene work emphasized in this definition will receive adequate consideration in the next chapter.

Thus far in our discussion the fact has been emphasized that the objective of mental hygiene is, in general, the attainment of mental health or mental soundness. But no attempt has been made so far to indicate what is involved in the positive concept of mental health from the psychological and social point of view. It is not sufficient to describe a sound mind negatively as a mind that is free from defect or disease or maladjustment. In planning programs for the conservation of mental health, we must do more than merely recognize undesirable mental symptoms that we should strive to avoid. It is even more important to have clearly in mind the desirable mental traits that we should attempt to cultivate. Certainly we shall fall short of our goal of developing wholesome personalities if we put the emphasis only upon the development of a healthy body, no matter how desirable such a body may be. A sound body will not in itself guarantee that the individual will possess those positive mental and social traits without which he cannot be considered to have a desirable, efficient personality make-up.

## 2. LIVING AS ADJUSTING<sup>3</sup>

*L. F. Shaffer*

One of the most basic generalizations of the biological sciences is that all living organisms tend to vary their activities in response to changed conditions in their environments. An animal's organic needs must be fulfilled by behavior that is effectively adapted to its opportunities. When external circumstances change, the animal must modify his behavior and discover new ways of satisfying his wants. This may be accomplished by new forms of response, by changing the environment, or in some exceptional cases by the modification of the organic needs themselves. This fundamental pattern of behavior is the adjustment process. As long as an animal continues to adjust and to modify its responses it continues to live. If it fails to adjust in some degree, its existence is imperiled. When an animal ceases entirely to adjust, it is dead.

The adjustments of organisms to their physiological needs illustrate the

<sup>3</sup>From L. F. Shaffer, *The Psychology of Adjustment*. Boston: Houghton Mifflin Company, 1936, pp. 3-4.

nature of adaptive behavior in its simplest form. The hungry dog may find food immediately available and be able to restore his inner equilibrium at once. If food is not present, the dog displays various activities that have previously brought about adjustment. He looks in accustomed places, whines, or seeks a person who has fed him in the past. These devices failing, the animal is stimulated to further activity by his organic state and runs about and explores until some discovery of food reduces his drive, making him again at peace with his environment. Adjustments to changes or temperature illustrate another simple adaptive pattern. If too hot, an individual is stirred to move until a cooler spot is found. When the situation is too cold for optimum organic operation, he moves to a warmer one. The inability to adjust to such simple organic annoyances is the proverbial limit of human ineptitude. "He doesn't know enough to come in out of the rain."

A broader meaning of the adjustment process is illustrated by the individual's relationships to his social environment. Not only must a person modify his behavior in response to his inner needs and the natural events of his surroundings, but he must also adapt to the presence and activities of his fellow men. A man who is ignored by a social group of which he wishes to be a member is placed in a situation to which he must adjust in some way. If a student fails a course, if a man is unsuccessful in his work, if a child feels insecure or unwanted in his home, adjustments are required to mediate between individual desires and the circumstances of the social milieu.

### 3. SOURCES OF INFORMATION MAKING FOR A SCIENTIFIC MENTAL HYGIENE<sup>4</sup>

*William H. Burnham*

Modern studies of the brain and mind, however, have yielded results that have at least formed a solid foundation for a scientific mental hygiene.

The chief results have come from four sources: (1) the physiological studies of the conditions of intellectual activity and feeling—a long series of investigations, from Mosso's early work on the cerebral conditions of mental activity to the recent studies by Cannon and others of the correlation of adrenal secretion and feeling; (2) recent studies in psychiatry; (3) recent experimental studies in psychology and pedagogy; and (4) recent genetic studies, of physiological and psychological age, and the like, among school children and defectives. On these results, which there is not time to mention here, a new application of hygiene, the hygiene of instruction, has developed.

Mental hygiene has clearly stated the problem of the hygiene of instruction, and it challenges every subject of instruction, every method and device, and even every pedagogical principle. It emphasizes the fact that, besides the direct pedagogical results of the study of any subject, there are also certain secondary results, and it notes the significance of these for health. Many ex-

<sup>4</sup> From William H. Burnham, "Mental Hygiene in the School." *Mental Hygiene*, 16, 1932, pp. 28-29.

amples of such secondary results might be cited—habits, attitudes, neuroses, arrests, important both for efficiency and health.

Efficiency in mental activity at any given time depends upon many conditions, both physiological and psychological. Among the former are physiological age; the blood supply to the brain, as determined by the general nutrition, the size of the cerebral arteries, exercises, posture, etc.; the quality of the blood, as determined by food, drugs, oxygen supply, etc.; the condition of the tissues and metabolism, as determined by the environment, temperature, humidity, barometric pressure, light, peripheral stimulation, etc. Among the latter, the psychological conditions, are the feeling tone, as determined by the conditions of the nerve centers, internal secretions, etc.; habits of work, of sleep, of attention, interest and association and self-control, reaction to feeling, etc.

To attempt to determine the conditions of healthful mental activity is an exceedingly complex problem, but here psychology comes to our aid, and, while noting the extreme complexity of the psychic processes in the active, thinking individual, it shows certain unifying laws and suggests the fundamental principles of a sound mental hygiene.

### III. Some Fundamental Aspects of Adjustment

#### I. THE ROLE OF PHYSICAL CONDITIONS IN BEHAVIOR PROBLEMS <sup>5</sup>

*Arthur R. Timme*

If our experience in child guidance has taught us anything, it has taught us the complexity of the causation of behavior problems. It has shown that the individual is inseparable from his environment; that to understand any of his behavior, any of his reactions to a given organic disease, we cannot ignore his environmental setting. It has shown that numerous factors are at work; it has shown the interplay between these factors and the need to envisage the problem in its entirety before an adequate plan of treatment can be formulated. It is not for naught that a study of the physical, intellectual, emotional, and social sides of a child is insisted upon. It is rare that the roots of a behavior difficulty do not extend into more than one of these fields. . . . [According to] Adolf Meyer the distinction between organic and functional is useless. The total individual in all his aspects is his concern. This means that the patient cannot be studied apart from his environment and his experiences, nor can his physical equipment be ignored. Thus, in so obviously organic a disease as general paresis, the content of the delusions is largely determined by the experiences of the patient; the poor man had delusions of wealth, the insignificant of power and glory, and the sexually impotent of great sexual prowess. To the syphilitic lesion, therefore, is due the fact *that* the psychosis occurs, while the psyche determines *how* the manifestations take place.

There are certain physical diseases, defects, and conditions that stand out in the experience of child guidance workers as having a definite bearing on

<sup>5</sup> From Arthur R. Timme, "The Role of Physical Conditions in Behavior Problems," *Mental Hygiene*, 15, 1931, pp. 470, 473.

behavior problems. The childhood diseases, such as mumps and measles, necessitating confinement and attention, frequently become the starting point of an egocentric, attention-demanding personality. The undue concern and oversolicitude of the parents create a situation which the child is loath to relinquish. When reality must again be faced after the illness, the contrast is too great and readjustment difficult. Here begins many of the flight-into-illness tendencies of the neurotic adult. In fact, any parental attitude that makes childhood and its experiences too attractive may seriously impair the urge to grow up and cause the various infantile fixations and regressions.

## 2. ENDOCRINE ASPECTS OF THE EMOTIONALLY UNSTABLE CHILD<sup>6</sup>

*A. S. Blumgarten*

There is rapidly accumulating evidence indicating a relationship between psychological processes and the function of the ductless glands. Consequently psychical disorders may result from or be a manifestation of a disturbance of a ductless gland. In order to indicate this relationship we shall first present some basic pertinent facts about endocrine function.

The ductless glands control growth and development, and they are important factors in physiologic and psychologic functions. In our present discussion we are chiefly concerned with the endocrine factors in psychologic functions.

Psychological processes are influenced by the ductless glands directly or indirectly. The ductless glands influence psychical and mental processes directly by means of the catalytic activity of their hormones, or by maintaining an abnormal state or pattern of development which carries with it an abnormal psychical pattern. The glands which influence psychologic processes are the thyroid, parathyroids, suprarenals, and to a lesser extent the gonads and pituitary. However, in the study of the emotionally unstable child we are especially interested in the relation of each of these glands to emotions.

The very evident emotional status of exophthalmic goiter and hyperthyroidism, characterized by a tendency to crying spells and other emotional outbursts, increased sensitiveness, and in some cases a boasting mania or exhibitionism, indicates the relation of the thyroid to emotions. Some cases show egomaniac or megalomaniac manifestations. Conversely, in thyroid insufficiency states (such as myxedema), depression, subnormal sensitiveness, and a lower emotional threshold may develop.

The parathyroids play a role in psychological processes, especially in the emotional sphere. They influence the physical responses to emotions by controlling calcium metabolism, an essential process in the function of the autonomic nervous system. This system in turn modifies the function of the nervous system by influencing the caliber of its blood vessels. Parathyroid insufficiency is often manifested by an increased physical response to emotions.

<sup>6</sup> From A. S. Blumgarten, "The Endocrine Aspects of the Emotionally Unstable Child." Langhorne, Pa.: The Woods Schools, 1935. *Child Research Clinic Series*, 1, No. 3, Part I, pp. 15-17.

It is well known that spasms of tetany develop suddenly and periodically in parathyroid insufficiency. Emotional outbursts and sudden, uncontrollable impulses may develop in the individual whose parathyroid function is diminished and whose calcium metabolism is disturbed.

The suprarenal glands have an important relation to the emotions. Cannon has long ago pointed out this relationship in his classic experiments in fear and anger. All the physical concomitants of fear (the pallor, trembling, rapid respirations, twitching of the lips, etc.) result from the sudden discharge of adrenalin in these emotional states. The mechanism of combat or flight—whichever is best suited for the survival of the individual—is controlled by the adrenal function.

The gonads play a role in emotions by maintaining the sex pattern of the individual. The emotional mechanism is more highly developed in the female; consequently a glandular mechanism which is dominantly feminine in character will have a greater emotional threshold and will develop emotional responses readily. On the other hand, a glandular mechanism dominated by the male gonads will be characterized by lessened emotional reactions. When the glandular mechanism deviates from the normal for the sex, the capacity for emotional response is modified. Thus when the male gonads are not sufficiently developed the capacity for emotional response is increased and may approach the feminine. Conversely, when the female gonad pattern is insufficiently developed the normal feminine emotional mechanism functions poorly.

The pituitary influences the emotions indirectly principally through its action on the gonads and by the activity of the thyrotropic and adrenotropic hormones. It is believed to influence especially the tender emotions, such as tenderheartedness, sympathy, kindness, etc.

The autonomic nervous system is the mechanism by which the physical concomitants of emotions are expressed. There is a definite relationship between the ductless glands and the autonomic nervous system. The relationship is a reciprocal one. For example, the stimulation or depression of the autonomic nervous system may stimulate or depress the secretion of a ductless gland and vice versa. This is especially evident in the function of the adrenal glands. An emotional stimulus will bring about the secretion of adrenalin or epinephrine from the adrenal medulla; and conversely, increased secretion of the adrenal medulla will bring about emotional responses.

#### IV. Adjustment of Children With Problems

##### I. SOME CHARACTERISTICS OF PROBLEM CHILDREN <sup>7</sup>

*Clara Bassett*

Many persons suffering from a frank mental disease are at large and their condition either goes unrecognized or they are regarded as merely eccen-

<sup>7</sup> From Clara Bassett, *The School and Mental Health*. New York: The Commonwealth Fund, 1931, pp. 1-2, 4, 5-6.



tric or peculiar. Examples of such people are the man who is constantly engaged in litigation, believing he is the object of conspiracies and plots which are being maneuvered by an enemy who is unjustly persecuting him, or the man who alternates between periods of great elation, exuberance, optimism, with bursts of highly successful endeavor and periods of gloom, depression, self-depreciation, hopelessness, and inability to do any work.

Another group of people may be more or less easily recognized as displaying personality traits and mental symptoms which indicate the possibility of a definite mental breakdown later on in life. For example, the young man who is always by himself, never mixing with others, absorbed in his own thoughts and fantasies; or the woman who in childhood was petted, shielded, taken care of, and always made the center of an admiring audience and who now evades all adult responsibilities and difficulties by getting hysterical attacks or developing physical symptoms which terrify those surrounding her into letting her have her own way.

In any community there is also great social wastage and friction due to large numbers of people who are rendered personally and socially ineffectual and unhappy because of warped personalities, unhealthy emotional attitudes, and wrong ways of handling the experiences of life. For instance, there is the mother who is a perpetual nag and scold, the man who has always been his "mother's sweetheart" and never leaves home; the woman whose life is filled with feelings of inferiority, fears, and worries and who never feels at ease or happy; the town drunkards and drug addicts; the chronic invalids who flit from one doctor to another in a vain effort to gain relief from their baffling afflictions; the miser who heartlessly exploits his employees in his pathological drive to pile up gold; the father who terrorizes, bullies, and tyrannizes over his wife and children. . . . Studies of dependents cared for by social service agencies also indicated that faulty physical, mental, and emotional habits extending back into early childhood really lie at the basis of most of their difficulties.

Many detailed studies of problem school children indicate that the difficult behavior on the part of the child can usually be traced directly to wrong ways of handling on the part of parents, to unhappy emotional relationships within the home, to physical handicaps, to vicious community environment which offers no constructive and satisfying outlets for the energies of the child, to irritable or severe discipline by an overburdened teacher, to a rigid school curriculum unsuited to the needs of the individual child, or to any combination of similar causes.

These facts greatly impressed the workers in these fields with the immense importance of reaching these threatened individuals at a much younger age when their problems are simpler and easier to understand and far more hopeful from the standpoint of treatment. . . . The study of children in nursery schools admitting children from the ages of three to five years, and in kindergartens handling children from the ages of five to seven, show that already the personalities of these children are fairly well developed.

Some of the problems resulting from unwise handling, which stand out when individual observation is possible, are neglected physical conditions in need of attention and special physical handicaps with resulting emotional difficulties in making healthy adjustments. The personal habits of many children are still in a chaotic, unregulated condition. Some show wrong habits of eating, eating anything, at any time and in any amount. Others still drink their milk from a bottle or resort to a pacifier, while still others show fussy likes and dislikes in the matter of food, or appetites requiring continual coaxing. Wrong habits of sleeping are evidenced by sleeping at any time, or only after a long-drawn-out battle before going to bed, by demands for the constant attendance and ministrations of the mother, by enuresis, nightmares, or terrifying dreams.

Other children show faulty elimination, with emotional problems resulting from parental use of disapproval, ridicule, punishment, and fear as methods for developing control. Inability to dress themselves or to care for their simplest needs characterizes other children in this group. The child who flies into temper tantrums whenever thwarted in any desire; the child who is abnormally timid, shrinking, and fearful; the one who is too dependent on its protecting mother and clings to the teacher; and the jealous child who resents attention to or achievement by other children—all stand out as in need of special understanding. Other children who present difficulties requiring careful retraining are: children who do not distinguish between fantasy and fact; those who bully or annoy other children; the ones who habitually take things which do not belong to them; or those who tend always to blame others for their own difficulties and mistakes. Sullen, resentful children who feel themselves picked on or discriminated against and shut out, the aggressive child clamoring for constant attention by showing off; the dreamy, solitary child absorbed in its inner fantasy life; the child who takes refuge in physical symptoms or complaints when confronted with difficult or unpleasant situations; and the child who shows unusual interest or curiosity in sex matters or participates in sex activities—all claim attention.

## 2. THE TEACHER'S APPROACH TO THE PROBLEM CHILD<sup>8</sup>

*Clara Bassett*

Other tendencies which the teacher must carefully avoid are those of cataloguing the misbehavior in a rigid, moralizing manner according to adult standards, and of feeling that it deserves punishment. It is obvious from thousands of careful studies of misbehaving children that there is no such thing as a "bad" child. There are sick children, children with a great variety of special handicaps, misunderstood children, badly trained children, children from miserable homes, and children seeking satisfaction in mistaken ways; but a deliberately "bad" child is an impossibility. Because of the very nature of childhood, with its plasticity, its suggestibility, and imitativeness, the problems of

<sup>8</sup> From Clara Bassett, *op. cit.*, pp. 9-12.

the child in the great majority of cases point directly back to the adults surrounding the child and to their ways of handling him. Thus, to punish the child without penetrating to the causes of the trouble is a grave injustice. This tendency to rigidly name and to classify misdemeanors and to immediately associate with them appropriate punishments is so ingrained in our thinking that only through special effort will the teacher succeed in freeing herself from this punitive point of view. The goal of her study is to guide the child to better adaptations, to more interesting outlets, to more enduring satisfactions, and not to punishment.

Another insight which will greatly aid the teacher in her study of the problem child is that behavior is purposive; it usually has a goal, which may be more or less unconscious on the part of the child but which can be ascertained by careful study. The child has certain fundamental emotional cravings, such as the need for affection and understanding, the need for respecting his parents and teachers, the need for security, the need for attention and approval, the need for successful achievement, the need for friends and companions, and the need for varied and interesting outlets for his energies in work and play. If the circumstances of the child's home and school life are such that they tend habitually to thwart or to deprive him or any or all of these legitimate satisfactions, or to overaccentuate any of them, the results show themselves in nervousness, in the development of unhappy personality traits, or in misbehavior. Thus, the misbehavior is merely a symptom of hidden maladjustments and the purpose of the child's behavior is usually a blind and misguided effort to secure satisfactions which are entirely natural and to which he is entitled. The first questions for consideration then are, why the child behaves in this manner; what satisfactions do his symptoms tend to secure for him; in what way is his life unsatisfactory to him; what methods of handling on the part of his parents, relatives, and teachers have resulted in these habits; what is the combination of circumstances which has called forth this reaction on the part of the child?

The teacher must also keep in mind the fact that the difficult personality traits and behavior of the child are not due to any mysterious dispensation but are the logical outcome of the life experiences of that individual and can be traced with fair clearness back through the years to their causes. The child's difficulties do not suddenly and perversely happen out of a clear sky. They usually have a long, intricate history extending into the past, in which the careful observer may discern the sequence of cause and effect. Thus, the path of understanding will require a greater expenditure of time and effort in patient inquiry than does the method of trial and punishment, but the constructive results flowing from the former method are incalculably greater.

If the teacher, in her study of the situation, will also remember the disarming fact that the most difficult and unlikable child is the very child most desperately in need of understanding and steady affection (for he is often unwanted, criticized, and mishandled at home, inept and unpopular with his companions, and something of a mystery and a burden to himself), she will

find this persistent interest and affection unlocking all doors and resulting in surprising changes in the child's behavior and personality.

Finally, even a slight observation of children's reactions must have already convinced the teacher that negative repression, reprimands, lecturing, and the "don't" method of handling problem behavior is utterly futile and a sad waste of her emotional energy.

### 3. THE EDUCATION OF BEHAVIOR-PROBLEM CHILDREN<sup>9</sup>

*Harry J. Baker*

Behavior problems are unique in that they tend to stimulate resistance and emotional stress in teachers, parents, and playmates, whereas teaching the blind does not tend to make for blindness in others, or deafness, or mental backwardness, as the case may be. They are distinct in the field of handicapped children in that the nature of their problem is so often regarded as merely lack of will power or some temporary casual factor which can be removed at will, but in the case of deafness it is immediately granted that there is a serious and permanent handicap and education must be built in the face of the handicap rather than hoping for its removal. Behavior problems are frequently felt to be a personal failure upon the part of the teacher, reflecting upon her teaching ability, and tearing down the social morale of her classroom, whereas she gets no such reaction if a child with serious vision defect cannot meet the standards of average children.

When we turn to affairs outside of school there are also unique problems for behavior children. The blind child is pitied, but not so with the child who takes toys from his neighbor, or teases the younger children, or who torments dumb animals. The older boy who becomes the nucleus of a gang and leads other innocent youths astray is not treated too considerably by irate fathers and mothers. And the parents and siblings of any black sheep resent having their own prestige openly degraded by one of their own flesh and blood. Truly it can be said that the so-called behavior-problem child offers some very complicated and emotional problems to himself, to his teachers, to his home, and to his neighborhood. These problems do not end with the passing of the adolescent youth out of school, or even out of the home; in fact, the problems often continue to increase and multiply resulting in economic and vocational inefficiency, in vagrancy, in crime, in danger and loss to society, in costs of legal and police protections, in untold costs in unhappiness. . . .

The modern keynote in behavior problems has changed from the problem child to the problems of the child. The child's problems are not only his but the home's, the school's, the community's, and often the child is hopelessly caught in a swirl of forces quite beyond his control, whose outcome for him can be accurately predicted as to their effects upon him once they are known and understood.

<sup>9</sup>From Harry J. Baker, "The Education of Behavior-Problem Children." *The Journal of Educational Sociology*, 6, 1933, pp. 362-370.

In the report of the committee of behavior problems of the White House Conference,\* behavior cases were grouped into three classes according to the major causes of maladjustment, the nervous, the emotionally unstable, and the delinquent. Each of these types will be considered.

Under the caption of the nervous child may be grouped all types of nervous or physical abnormalities which may lead to behavior maladjustment. Children are included here whose nervous vitality is low, cases of chorea, of physical immaturity, of glandular disturbances, of sensory defects, such as impaired vision, cases of defective hearing, of chronic illness, those suffering from all of the common infectious diseases of childhood, children who are crippled, and those whose general health is below par. It is not to be assumed that all children, much less a majority of children, suffering in some degree from these disabilities are to be classified as behavior problems, but there is a goodly number from this general group who manifest behavior difficulties which may be traced to the physical causes. Any of these types may illustrate the behavior pattern somewhat as follows: The child with uncorrected defective vision works under a nervous strain on account of his faulty vision, he becomes irritable, he seeks for recognition and approval through other channels, and approval may be pleasant to a certain extent even if it becomes social disapproval. Every child whose physical condition is not corrected and whose school program is not adjusted for the happiest success is potentially a behavior-problem case. . . . While behavior problems are not limited to children with nervous or physical disabilities, a goodly number have some such disabilities which probably play some part in their maladjustments.

The second class of cases is the emotionally unstable. Conditions within the individual are the prime cause. They may be predisposed to a weakness in the sphere of feelings and emotions, with a bent towards abnormal feelings of hatred or unnatural attraction to unusual objects of affection. In children such manifestations are not usually considered as advanced mental instability, but when these factors continue and grow in their adult lives, these individuals often become mental patients. Emotional conflicts which average individuals weather without great difficulty conquer them. These conflicts may be incited in three principal ways. The first is the conflict between basic instincts such as fear, self-preservation, and the social mandates of unselfishness, desire for social approval, and kindred topics; the second is the conflict at adolescence between remaining as a child within the physical and mental protection of the home and the drive for independence, which is normal at this period; the third conflict may come at any time and it is the conflict between reality and fantasy, between having a used Ford and dreaming of a new Lincoln, and finally becoming so engrossed that the patient can no longer distinguish between fact and imagination. These three kinds of conflicts are particularly troublesome to those whose emotional maturity is below the expected aver-

\* White House Conference on Child Health and Protection, 1930, Committee on Special Classes, *Special Education; The Handicapped and the Gifted* (New York: The Century Company, 1931), pp. 491-534.

age. To a certain extent the conflicts which arise among the first class of causes—the physical and nervous causes—may carry an emotional tone which tends to place the individual in the second class as well as in the first.

The third general class of causes of behavior maladjustment is delinquency. Under this heading are listed the great variety of social factors, factors arising outside of the individual himself, but working within him and upon him in many undesirable ways. Here is to be found the broken home, the overindulgent parents, the jealousy of younger children, the influence of the bad gang, the effect of an education not suited to the mental and physical needs of the child. It is very difficult to gather accurate and adequate data on the causes of behavior maladjustment, but the great number of factors operating in this third field makes it seem probable that fully one half or more of the total of behavior cases arise in this group. Here is a fruitful field of endeavor for those reformers who place all their faith in what environment is able to do. The child who is easily lead falls under the influence of undesirable factors and his path to delinquency is broad and the down grade is easy to follow. These factors operate more commonly in undesirable homes of poor social status found near the business and manufacturing districts, near docks and railroads, where the home itself offers less of a worthy nature and the street offers many more chances for gangs. There is a lack of feeling of ownership, and this district is inhabited by parents who are clinging to old-world traditions and language from which their own children are withdrawing and revolting. Whenever a location map is prepared of the active cases of juvenile delinquency in any large city such a map is almost identical to that of all other large cities, after allowance is made for varying geographical formation. In all cities there is also a scattering of cases throughout the entire area which represents the occasional individual case probably falling within the first two classes of causes.

There are at least three avenues of approach to the solution of the problems of behavior children: the school, the home, the community. The school has a definite responsibility for all cases of handicapped children, whether the handicap be physical, mental, or emotional. At present not more than 10 per cent of all handicapped children are receiving the special education suited to [their] abilities and to the minimizing of their disabilities. The schools need more public support to put an adequate program into effect for all underprivileged children, since the costs are greater than for average children. Not only must provision be made for the definitely handicapped children but for those who deviate slightly from the average, such as children who are mentally slow. It is among dull children that the greatest amount of delinquency is found. The schools are well aware that the retarded child who finds the school program too difficult, the child who fails frequently, who becomes a repeater and over age for his grade, who eventually leaves school with a pitiful educational record does not have the most wholesome and optimistic attitude towards life's problems. In the past five years several publications have ap-

peared dealing with this problem.\* In the program for average children the problem of mental hygiene in the daily classroom procedure is receiving more attention. The modern educational program is attempting to educate not only in the three R's but in the social contacts of the auditorium and play activities of the gymnasium. The school program is limited by lacking finances rather than in not knowing what should be done.

The problems of the home are being approached more vigorously than ever before as shown by the increase in the parent-teacher movement, in the child-study clubs, in the number of periodicals devoted to childhood, in the child talks in daily newspapers and by radio. These efforts are very beneficial as far as they go and they reach a large number of cultured and intelligent homes, but they do not, as yet, often touch the homes in which there is the greatest need. Frequently we hear that a certain talk to parents was fine, but that the people who most needed to benefit did not hear it. There is a practical difficulty in dealing with parents of problem children arising from the degree or seriousness of the situation. The most constructive work can be done when problems have not yet arisen or when they are still in the early stages, but in this period parents are not particularly concerned or alarmed. But after the case has reached a serious crisis there is usually much more parental concern and co-operation with the agencies which deal with their problems.

The problems of the home will not be solved within a short period, much less in one or two generations. Witness the fact that there are at least 200,000 infants born out of wedlock annually, that an equal number of children get into the hands of the juvenile courts annually, that each year 500,000 adults are sentenced to penal institutions and many of these are parents of children who must face the taunts and jibes of their playmates and the indifference or antagonism of their neighbors. However, there is hope even in these situations since the happiness of children in their homes, fortunately, is not merely correlated with high intelligence and culture, in fact, in some of the most impoverished homes, socially, mentally, and economically, we sometimes find a healthy emotional attitude and understanding between parents and children, although it may be on a very crude and elementary level. It is most unfortunate that mental neglect and emotional maladjustments—factors causing much of our delinquency—can seldom be preferred as court charges against inadequate parents, whereas corporal punishment and physical neglect have much greater esteem in the eyes of the law.

The third avenue deals with the agencies of the community outside of the home and the school which influence the life of the child. It has already been noted that the greatest areas of acute delinquency arise in the neighborhood of business and manufacturing centers, and it is in these places that the least is being afforded at either public or private expense to offset the

\* Harry J. Baker, *Characteristic Differences in Bright and Dull Pupils* (Bloomington, Illinois: The Public School Publishing Company, 1927), 118 pages.

Annie D. Inskeep, *Teaching Dull and Retarded Children* (New York: The Macmillan Company, 1926), 455 pages.

undesirable trends. The residents of the so-called better sections take pride in their local church and in their neighborhood association, they are less concerned and are often unaware that their tax bills go to balance the budget in other districts where the public expense of crime and delinquency mounts to appalling figures. One sometimes questions the wisdom of spending millions of dollars, [in] public or private charity, even in times of prosperity for families who make no attempt to secure employment or to change their living conditions even when under the supervision of some social agency. Again it should be noted that in isolated centers, here and there, recreation programs, neighborhood houses, and community leaders have brought about remarkable changes, and this is a hopeful indication of what could be done on a larger scale. The activities of such organizations as the Boy Scouts and the Girl Reserves are to be highly commended, but all of them are dealing with isolated fragments of a large problem, and what is everyone's business is no one's business when it comes to considering the situation in its entirety. There is needed a vigorous leadership and co-ordination of all of the social agencies surveying all of the needs and assigning them to suitable agencies now existing or to be created to meet these specific problems. There is no inherently mysterious problem which has not been solved, except that of finding out how to evolve a more understanding and comprehensive program and put it into operation on a large scale.

#### 4. CONDUCT DISORDERS IN ADOLESCENTS<sup>10</sup>

*Edmund S. Conklin*

Where so much growth and so many changes are taking place it would be strange indeed if there were not many accidents, some of a serious nature. That there are such accidents, some of them so serious as to endanger the whole future mental health of the individual, no one would be foolish enough to deny. But it is now quite certain that the frequency of the more serious conduct disorders as a consequence of growth-change accidents has often been exaggerated. Mental abnormalities do appear in childhood and in adolescence, but neither of these growth periods can be termed periods of special instability. They are, however, periods of inconsistency of conduct, which is merely another way of saying that they are periods of immaturity and inexperience, or of saying that they are periods in which the personality organization and the life adjustments are both in process of development.

The course of these growth changes is sometimes comparatively serene. At other times guidance is ill-advised or unexpected things happen and the consequence is a conflict between some desire of the individual and something in the environment, or some other desire of the individual, which results in conduct sufficiently unusual or undesirable to be classed as a conduct disorder. There may even be an uneven development resulting in a contrast between a fair degree of maturity for the age level in all except some one feature—

<sup>10</sup> Used by permission of the author.



social adjustment, for example. In such cases the inexperience and immaturity of the individual in all social matters is so out of harmony with the social setting into which his age and degree of knowledge bring him as to reveal him to be badly maladjusted. He does not know how to live with others and so there are efforts to escape, crude defensive reactions, impulsive attempts at compensation, or some form of imperfect and inadequate attempt at adjustment.

Many other forms of conduct disorder are known. Stealing, for example, may be traced to inferiority disturbances or to the lack of proper opportunities for the thrill of personal achievement in some fashion. Persistence of parental domination may result in rebelliousness of an erratic and impulsive nature. Truancy has been traced to childish misconceptions of the self and of the parents, sometimes to the notion that the parents are really but foster parents; sometimes it is traceable to the consequences of much daydreaming. And then the motivation for the daydreaming may be found in a social maladjustment of some sort. So the trend of thinking today concerning the conduct disorders of childhood and adolescence is steadily toward interpretation in terms of growth disturbances or distortions. There are, to be sure, instances of inherent defects which first make their appearance in childhood or adolescent years, but these are comparatively few in number. The delinquencies and disciplinary problems when properly understood are nearly all of a functional nature and can be righted when so understood, if the necessary control of all of the factors can be obtained. Finally, it should be stressed that there is danger of overemphasizing many of the growth troubles of children and adolescents because far the larger part of them never result in anything serious—they disappear in the “give and take” of life, or it may be safe to say that they are actually outgrown.

#### 5. THE WORK OF A PSYCHO-EDUCATIONAL AND MENTAL HYGIENE CLINIC<sup>11</sup>

*Donald Snedden*

I shall comment on the work of a psycho-educational and mental hygiene clinic under three heads: first, the training function of a clinic; second, the research function of the clinic; and third, the service function of the clinic.

That these functions are not mutually exclusive is perfectly realized, but no work as complex as that of a psychological clinic can afford to fail to consider most carefully its functions, not only in their interrelations, but also in their separateness. A psychological clinic is like one of the children with whom it most often deals—it must be considered both analytically and synthetically. Looking only at the parts of the complex will not give a true “whole” picture, and it is just as true that we cannot look at the whole picture with the fullest understanding unless we are aware of all of the parts.

Most psycho-educational and mental hygiene clinics serve in some measure

<sup>11</sup> From Donald Snedden, “The Work of a Psycho-Educational and Mental Hygiene Clinic.” *The Journal of Educational Sociology*, 6, 1933, pp. 516-521.

as training grounds for students who are acquiring skill in the processes involved in clinical work. As a matter of fact many clinics tacitly exist *chiefly* to train students. This is a state of affairs that is certainly not to be condemned. Skill in clinical psychology, the field being what it is, is not easily acquired. We want, and feel we have a right to demand, high standards of training for our psychologists. . . .

As most psycho-educational and mental hygiene clinics are organized, the research function is minimized. . . . The research approach to the involved problems of personality is an approach that differs in kind from the clinical approach. If the clinic attempts to make use of its clinical findings in a research way—and some few clinics do—the researches are quite apt to be rather weak. It is perhaps true that some of the researches that have come out of clinics (for example, those of the Judge Baker Foundation) are the best studies of certain problems that are available, but this does not deny that they are essentially weak. Dealing, as a clinic usually does, only with cases that are abnormal or that are suspected of being abnormal, it is very difficult indeed adequately to control and check the results of research so that we have a clear picture of the true relationship between various factors and a behavior pattern. It is only when research on a specific plan is undertaken by an individual or an organization with sufficient resources to see the plan through, and to obtain the necessary control data, that the results are likely to be of great value. . . .

Service to the community is, obviously, the *raison d'être* of a psychological clinic. If, in some few cases, the primary object of a clinic seems to be that of training students in the procedures of clinical psychology, the service may appear to be, as regards the children of the community, a deferred service. However, even in these cases, since the students cannot learn *in vacuo*, some children must be dealt with and well dealt with if the students are to learn well.

Except under certain limiting circumstances, such as obvious lack of resources, the service function of a clinic probably should subordinate the training function and the research function.

Generally speaking, and probably in rough order of practice at the present time, psychological clinics attempt to handle three kinds of cases:

1. General scholastic retardation or failure problems
2. Behavior problems—general or specific delinquency
3. Problems of specific subject retardation, especially in the school subjects—special disability cases in reading, arithmetic, speech, etc.

Although it is perfectly true that individual cases are referred to the clinic for one or the other of the above three headings, it is not at all possible to say that the diagnosis and treatment of the three types of cases is, or should be, entirely different. Such would, of course, be the case were the three above-mentioned classes of cases rigidly independent. But, obviously, they are not all independent. Any one of them may be and, as a matter of fact, more often than not is in some measure associated with one or both of the other types.

Therefore, although a psychological clinic may *aim* at the solution of behavior difficulties, or the treatment of general scholastic retardation, or specific subject disability, it will find that it must be equipped and staffed to do all kinds of psychological work. This is a large order. It is entirely possible, however, to reduce its formidability by specifying the kind of immediate problem the clinic is attempting to handle, and certain age and other ranges within which the clinic will confine itself. For example, a clinic may confine its attentions to preschool or very young school children, as do Dr. Thom's well-known Habit Clinics in Boston, or it may exclude such young children from its clinical facilities, as do, in effect, most of the clinics operated in conjunction with school systems. This simplifies the matter considerably. Or it may, as does the Inceptive Clinic for the Social Adjustment of the Gifted, confine its attention to those within a certain I.Q. range, thereby eliminating most, although not necessarily all, of the problem of general scholastic retardation.

A service primarily directed towards diagnostic and remedial work might well set a lower limit in I.Q. below which it would not attempt to handle the cases, as did Dr. Gates, for example, in studying backwardness in reading only in cases where the I.Q. was above 85. (The median I.Q. of his cases was over 105.)

It is impossible, of course, to state where a clinic should direct its initial attention. This will be determined by what kind of service the clinic desires and what kind it is staffed and equipped to handle.

If, however, we might be permitted to generalize about the work of the hypothetically typical psycho-educational and mental hygiene clinics, might it be fair to posit the following generalities?

Other things being equal, the clinic, not being a research institution, should lean most heavily on those techniques in its repertoire that are known to be most valid and most reliable. This, of course, being subject to the qualification that the best established techniques are such as are of demonstrated importance. There are, to be sure, a number of techniques that are highly reliable but rather useless. For example, highly reliable anatomic indices based on carpal ossification can be rather readily secured, but, unfortunately, it has been fairly well established that carpal ossification is *not* of any particular importance in clinical psychology. There are, on the other hand, scores of tests like the Cube Imitation test of Knox that are presumably testing factors in the personality make-up of the individual that may be of great importance, but performance on this particular test is so unreliable, in the statistical sense, that we are practically forced to abandon the use of it. Some tests, or techniques, are of demonstrated low reliability, but of such obvious importance that we must, for the present, put up with them, hoping, however, that the researches will find ways, most of them relatively simple, to increase the reliability of the devices. A test case in point is that of Stenquist's Assembly test, which seems to correlate rather well with success in shop courses in school,

in spite of the fact that the reliability of the test itself is not higher than .7 and is probably closer to .6.

Of course, the most obvious case in point concerns the reliability of character judgments or personality judgments. It is granted that these relatively obscure factors are vitally concerned in every adjustment problem that is brought to the clinic. Even in such a specific matter as backwardness in reading, Dr. Gates found that 82 per cent of his cases had definitely undesirable attitudes towards the matter. These specific undesirable attitudes in some cases were apparently causal, in some it could be shown that they were more or less directly the *result* of failure in reading, more specifically caused by improper acquisition of the reading techniques. In a sense, practically all of the work now being done in the mental hygiene field is being done with techniques so unreliable as to cause shudders among those doing the work when they stop to think about it.

But the mental hygiene work "must go on." It is of tremendous importance. The development of attitudes and the way these attitudes translate themselves into behavior is every bit more important than the development of certain rather impersonal capacities and abilities. However, the weight that should be attached to any factor in a situation of this sort is a function not of importance alone but of the reliability of our measurement of the factor. Is it realized that if two factors are by their nature equally important in affecting a composite, and if scores on the two tests measuring these factors have the same dispersions, then if one test has a reliability of .96 and the other a reliability of .64, the former, statistically speaking, deserves about eleven times the weight of the latter? Now .96 is not too high a reliability coefficient for a first-rate individual intelligence test. How is .64 as a measure of the reliability of social intelligence? Well, if we could always feel that our judgments of social intelligence were that reliable we might well be called optimists in clinical psychology. What is there to do? Shall we, therefore, take eleven times the obtained I.Q. and add one time the estimated S.Q. (social quotient) to get some one mechanical representation of the whole? Of course not. The procedure would not only be a mistake from beginning to end, but our grand weighted average would be practically useless, for we would not be able to give it a satisfactory name, without which we, being limited mortals, flounder terribly. Obviously, there is no immediate "way out." We must subjectively evaluate each element in the whole situation, taking into account:

A. The importance of the factors in the case of the individual under consideration

B. The probable reliability of our estimates of the amounts of each factor involved

C. And on the basis of these horribly subjective considerations we must combine the findings into, first, a diagnosis of the particular difficulty and, second, a program of remedial measures. . . .

6. THE CHILD GUIDANCE CLINIC<sup>12</sup>*George S. Stevenson*

The child guidance clinic is a psychiatric clinic designed to diagnose and treat the behavior and personality problems of childhood. These problems are made manifest by disorders of behavior, such as tantrums, stealing, seclusiveness, truancy, cruelty, sensitiveness, restlessness, and fears. The clinic treats these problems by treating not only the child through whom they become overt, but as well the family, school, recreational, and other involved factors and persons which contribute to the problem and whose disorder the problem may really reflect. It is the function of this discussion to show how child guidance clinics have developed and how they are operating. . . .

Child guidance is one of a group of closely related and overlapping techniques and sciences dealing with human adjustment, which also includes psychiatry, criminology, social work, law, pedagogy, and others. The work of the child guidance clinic is a specialized type of psychiatry, although it has been enriched by contributions from several fields. The study of psychoses and their beginnings has revealed childhood as the period of hope and prevention, the period for refinement of the mental fabric. Such study has shown the weaknesses of this fabric and the opportunities for prevention. But criminology, social work, and other fields have similarly striven for prevention and in so doing have been led to child guidance and the need for the type of service provided by the child guidance clinic. It is axiomatic in all these fields that one very fruitful path to prevention lies in correcting mental deviations in their incipency, in establishing a mentally healthy milieu for the child, and in creating among adults a general understanding of the needs of the child for healthy mental development. It is the function of the child guidance clinic to sponsor these efforts, developing its own resources and organization to study and treat the more complex individual problems and helping the community to deal with the less complex problems through its own resources. It recognizes the dependence of many behavior problems upon social or environmental rather than individual distortion and the responsibility and authority of other groups for dealing with these through community reconstruction. It reserves for itself responsibility for the medical (psychiatric) or quasi-medical (psychiatry plus assistance) aspects of child guidance.

Mental deficiency per se is not a problem for the child guidance clinic, but a clinic is concerned with the mental distortions that may exist in the mental defective. The child guidance clinic is interested in educational, industrial, and social structures that allow the mental defective to enjoy a healthy mental experience. The mere diagnosis of mental deficiency is outside its scope. It is similarly interested in programs of special education for the handicapped. The child guidance clinic has closer relation to work with the pre-

<sup>12</sup> From George S. Stevenson, "The Child Guidance Clinic—Its Aims, Growth, and Methods," *Proceedings of the First International Congress on Mental Hygiene*, The International Committee for Mental Hygiene, 2, 1932, pp. 251-253.

school child and to parental education because of the role played by parental ignorance and early habits and attitudes as major contributors to the behavior problems of childhood. As these connections vary, so the correlated clinics vary in their complexity and take on different shadings as they function in special relation to social service, the court, pedagogy, medicine, and religion.

It has already been hinted that child guidance received its major impetus from several techniques dealing with human maladjustment. These include the fields of mental disease, delinquency, and dependency. The need of individualization in education has given further impetus, and more latterly the problems of industry and vocational adjustment have led back to and given sanction to the handling of the behavior problems of children. But the sanctions given by these technical fields would probably have been sterile had it not been for scientific advances which gave the means for guiding children. Physiology, psychology, and sociology have provided child guidance with important tools and twentieth-century cultural progress has furnished the atmosphere for their efficient use.

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## EXERCISES

1. Show that any adequate conception of health embraces the entire organism and not simply isolated parts or functions. Show why the differentiation of diseases and disorders into organic and functional types is now generally regarded as a useless distinction.
2. Collect concrete data which support the contention that mental health and behavior adjustments are influenced by glandular dysfunctioning, disease toxins, and pus in the system.
3. Make a study of what constitutes a behavior problem from the standpoint (1) of the teacher and (2) of the school psychiatrist.
4. Children with problems are found in every school system. Some communities have many more cases than other communities. Outline a functional program that the superintendent of schools might introduce which could largely prevent the acquisition of personality maladjustments.
5. Make a survey of the home as a source of personality maladjustments and report your findings and recommendations to the class.
6. Make a list of conventional school practices that violate sound principles of wholesome personality development. How may your local school authorities be induced to make changes that will be compatible with the known facts in this field.
7. Prepare a brief in support of the thesis that every school system needs the services of thoroughly trained psychiatrists.
8. Give examples of psychological principles and procedures that make for good mental health in the classroom.
9. Outline the program and activities of a good child guidance clinic.
10. Make a list of the characteristics of socially maladjusted children.
11. Outline the functions of a school psychiatrist.
12. How do teachers often unwittingly contribute to the development of personality disorders in children?
13. Knowing that you have been studying this subject, your school principal asks you to submit to him a practical plan for preventing the development of personality disorders. Discuss the plan you would propose, indicating its bearing on (1) home and school co-operation, (2) the curriculum, (3) type of school, (4) training of teachers, and (5) just how the school psychiatrist, school nurse, school psychologist, and the classroom teacher would fit into the picture.
14. What probable effect have the following upon the mental health of school children: (1) frequent attendance at the movies; (2) studying while a radio is "going full blast" in the room; (3) getting only six or seven hours of sleep each night; (4) no opportunity for recreation; (5) living with quarrelsome parents; (6) failing in schoolwork; (7) no interest in schoolwork; (8) dislike of the teacher; and (9) such handicaps as speech disorders, physical deformities, and esotropia (cross-eye)?

## CHAPTER XXIV<sup>1</sup>

### ABNORMAL AND ATYPICAL CHILDREN AND THEIR ADJUSTMENTS

*William A. Kelly, The Creighton University*

#### I. Introduction

While every child possesses his own distinctive characteristics and qualities which constitute his individuality, nevertheless there are some children who are so extremely different from others that they present very special problems. These children are so divergent that they require special educational consideration, special facilities, and special curriculum provisions if their capacities and powers are to be developed to the full extent both for their own happiness and for the welfare of society.

The term "atypical children" is used to designate those children who deviate to a marked degree from type. The term "abnormal children" is often used as a synonym, although most authorities prefer to limit its use to certain kinds of excessive departures from the average. In this chapter the terms "atypical" and "abnormal" are used to denote marked irregularities and divergence owing to physical handicaps, mental deficiency, personality maladjustments, antisocial traits, and unsocial tendencies. In keeping with this definition, abnormal and atypical children may be classified conveniently into the following groups: the physically handicapped, the mentally different, and the socially maladjusted.

#### THE INCIDENCE OF ABNORMAL AND ATYPICAL CHILDREN<sup>2</sup>

##### *White House Conference*

There are in the United States more than 10,000,000 abnormal and atypical children. The White House Conference has estimated the number of these children to be:

3,000,000 children with impaired hearing  
17,000 of which are deaf  
65,000 visually handicapped children of which  
15,000 are blind, and  
50,000 partially seeing

<sup>1</sup> The selections in this chapter give consideration to several types of atypical children and indicate some of the adjustments needed. They afford excellent supplementary reading in connection with the following: Skinner and Collaborators, *Educational Psychology*, Chapters XXI and XXII; Powers and Uhl, *Psychological Principles of Education*, Chapter XIII; Gast and Skinner, *Educational Psychology*, Chapter V; Eurich and Carroll, *Educational Psychology*, Chapters XI and XII; Fletcher, *Psychology in Education*, Chapter XIV; Pressey, *Psychology and the New Education*, Chapter VIII; and Hollingworth, *Educational Psychology*, Chapter XII.

<sup>2</sup> From *White House Conference, Addresses and Abstracts of Committee Reports*, New York: D. Appleton-Century Company, 1931, pp. 292-293.



- 300,000 crippled children
- 400,000 tuberculous children and
- 850,000 suspected cases of tuberculosis
- 450,000 children with cardiac limitations
- 2,500,000 children with well-marked behavior difficulties including the more serious mental and nervous disorders
- 6,500,000 children who are mentally deficient (as newly defined)
- 850,000 of whom are definitely feeble-minded and
- 5,650,000 who are intellectually subnormal
- 150,000 epileptic children
- 200,000 who appear each year before the courts as delinquent.

## II. The Physically Handicapped Child

The physically handicapped child is recognized easily and readily in many instances. Crippled limbs, speech defects, blindness, and the like are obvious. Other handicaps, such as malnutrition, anemia, cardiac limitations, tubercular tendencies, and glandular disturbances, are usually discovered through a complete medical and physical examination. Because so many of these physical handicaps are preventable and so many are curable, every child should receive a thorough health examination at least once every year. It is worthy of note here that the normal child of today may easily become the physically handicapped child of tomorrow because of disease, injury, or accident. Prevention is the keynote that should always be stressed.

When these physical handicaps are congenital or when they are acquired in infancy and preschool years, it is especially important that they be discovered and remedial measures applied to strengthen vision and hearing, to curb the effects of disease, to straighten limbs, and to bring growth and development as nearly as possible to a normal level. Since it is never wise or safe to rely on the child's outgrowing his handicaps, the training and education of the child to compensate for his handicaps should be started as early as possible.

Such training and education must emphasize the principle that the physically handicapped child is not necessarily a liability but rather that he is potentially a social asset. That physical handicaps are surmountable has been demonstrated by Helen Keller, by Laura Bridgman, and by the many others\* who though handicapped by seemingly insuperable physical defects have accomplished noteworthy achievements in many fields of industry, art, and science. The physically handicapped child must receive that type of training and education which will enable him to overcome these disabilities to the greatest possible extent and to realize his capacities to the fullest measure. Such training and education must strive to achieve in these children stability of character, self-dependence, and responsibility and should enable them to live a useful and contented lives. Many of these physically handicapped children require highly specialized training and special methods of instruction to enable them to realize their capacities in spite of their disadvantages.

\* Cf. W. A. Kelly, "A Blind Practice Teacher in a Sighted Class." *Outlook for the Blind*, 29, 1934, pp. 143-147 for an account of such an individual.

## I. THE DEAF AND PARTIALLY HEARING CHILD

1. The Deaf Child <sup>3</sup>*White House Conference*

The deaf are those who were born either totally deaf or sufficiently deaf to prevent the establishment of speech and natural language; those who became deaf in childhood before language and speech were established; or those who became deaf in childhood so soon after the natural establishment of speech and language that the ability to speak and understand speech and language has been practically lost to them.

11. Special Problems in the Education of the Deaf <sup>4</sup>*Beatrice McLeod*

. . . Children who are deficient in hearing are divided into two distinct groups, the differentiation of which is fundamental in determining the type of training suitable for each. Different medical, social, psychological, and educational problems are all involved as we study the respective needs of the deaf, on the one hand, and of the hard of hearing, on the other hand.

The child who is totally or almost totally deaf from birth or infancy, having never heard or established speech, has no speech himself and does not understand language. Hence the common characterization of "deaf and dumb" that one used to hear about him but which fortunately is becoming an obsolete expression. A deaf child is dumb only because he does not have an opportunity to hear and therefore to imitate the speech going on about him. Therefore he represents an educational problem involving the teaching of speech, language, and lip reading. Lip reading (or speech reading, as it is sometimes called) is the ability to understand spoken words and language by watching the movements of the lips and other facial muscles. This is one of the most important elements involved in the education of deaf persons, since they are powerless to hear the spoken word with their ears.

The deaf person who is uneducated is very different from a normal individual. If he has no speech and cannot read lips, he is very much isolated because he is unable to understand the speech of his fellow men and has no means of communicating his thoughts and ideas to others except by gestures. Such a handicap makes the deaf appear different and even peculiar. Proper education of these handicapped individuals will have a tendency to make them less different and conspicuous. They need to learn to use their voices, to develop vocabulary, and to learn language, so as to be able to communicate by means of speech. Their whole social and mental lives may be enriched in such a way as to prevent their becoming shut-in, unhappy, socially maladjusted personalities. An education helps to prepare the individual for

<sup>3</sup> From *White House Conference, Special Education: The Handicapped and the Gifted*. New York: D. Appleton-Century Company, 1931, p. 277.

<sup>4</sup> From Beatrice McLeod, *Deaf and Hard-of-Hearing Children*, Pamphlet No. 54, United States Dept. of Interior, Office of Education, Washington, D. C., 1934, pp. 16-17.

a fuller, richer, happier life; to equip him to take his place in the economic world; and to compete with normal people in a way that would otherwise be impossible.

Educating the deaf is a very difficult problem; therefore we must begin early. The child has so many things to learn. He has no language as normal children have; he has to learn speech and speech reading in addition to the regular academic subjects pursued by other children. Much more time is necessary to accomplish this. Special day-school classes have been organized in many cities providing the type of education deaf children need. In addition, a public residential school for the deaf exists in each of forty-four states, while the other four states pay tuition for such children in the schools of neighboring states.

### iii. The Partially Hearing Child <sup>5</sup>

#### *White House Conference*

The hard of hearing are those who established speech and ability to understand speech and language, and subsequently developed impairment of hearing. These children are sound conscious and have a normal, or almost normal, attitude towards the world of sound in which they live.

### iv. Symptoms That Characterize the Hard-of-hearing Child <sup>6</sup>

#### *Beatrice McLeod*

Some of the common manifestations of defective hearing are inattention, slow thinking, poor general school progress, imperfect speech, earache, discharging ear, peculiar postures, and mouth breathing. A bewildered, baffled expression often seen on the face of a child may be regarded as a possible indication of defective hearing. Due to hearing difficulty, the child may become sensitive, aloof, suspicious, and resentful in his attitudes. It is true, of course, that defects other than hearing may show some of the same symptoms; in any case they should be traced to their source.

There is frequent connection between hearing defects and school retardation. Some children have been classed as mentally deficient who were later found to appear dull only because of impaired hearing. The teacher should therefore be alert to all symptoms characteristic of children with ear trouble. Early detection, if followed by proper treatment and care, will often prevent total loss of hearing.

### v. Special Problems in the Education of the Partially Hearing Child <sup>7</sup>

#### *Beatrice McLeod*

The hard-of-hearing child has a distinct advantage over the deaf child in having some experience with speech and language. If his hearing is only

<sup>5</sup> From *White House Conference, Special Education: The Handicapped and the Gifted*. New York: D. Appleton-Century Company, 1931, p. 277.

<sup>6</sup> From Beatrice McLeod, *Deaf and Hard-of-Hearing Children*, Pamphlet No. 54, United States Dept. of Interior, Office of Education, Washington, D. C., 1934, pp. 9-10.

<sup>7</sup> From Beatrice McLeod, *op. cit.*, p. 18.

slightly impaired he may pass undetected unless careful examination of all children in the class is made. His special needs are: First, diagnosis as to the cause of the condition; second, attention from a competent otologist looking toward possible remedy of the condition or at least prevention of its growing worse; third (if his hearing cannot be improved or the hearing loss is likely to increase), instruction in lip reading and sometimes in speech correction also. If proper provisions are made for him, such a child can work in a regular grade and be given lip reading by an itinerant teacher who has had training for this type of instruction.

Children whose impairment of hearing is more severe should be given, first, otological attention; second, very careful training in speech, lip reading, and language; third, stimulation of whatever residual hearing they have; and, fourth, vocational guidance which takes into consideration every asset of character they possess and every advantage offered by their partial hearing.

Varying degrees of hearing impairment require teaching techniques which differ according to the amount of hearing loss and the age of the child. The hard-of-hearing child who has established a good command of speech and language before impairment of hearing has set in will obviously have less difficulty in retaining them than the child whose speech and language are not so well established. Young hard-of-hearing children are generally deficient in language accomplishment and may develop voice and speech difficulties, in which case effort must be made to preserve the speech and the quality of the voice.

## 2. THE BLIND AND PARTIALLY SEEING CHILD

### i. The Blind Child <sup>8</sup>

*Beatrice McLeod*

. . . Who should be considered blind from an educational point of view? All of the children who are totally blind and those who have some light perception but not enough to enable them to secure their education by means of vision must be educated through the tactile sense, or sense of touch. In general, it is agreed that those children are considered blind from an educational point of view whose vision is 20/200 or less as measured by the Snellen chart after proper correction is made or treatment is given; and that they should be educated in a school or class for the blind in which the tactile method is used.

### ii. The Partially Seeing Child <sup>9</sup>

*Beatrice McLeod*

Children with vision greater than 20/200, yet with serious visual defects which make it necessary for them to have special educational provisions,

<sup>8</sup> From Beatrice McLeod, *The Blind and Partially Seeing Children*, Pamphlet No. 40, United States Dept. of Interior, Office of Education, Washington, D. C., 1933, pp. 8-9.

<sup>9</sup> From Beatrice McLeod, *op. cit.*, pp. 9-10.

fall within another classification and present a different type of problem. This group has been designated as partially seeing. Because of their seriously defective vision they cannot profitably be educated in the regular grades, and arrangements need to be made whereby they will be enabled to do the regular grade work and yet conserve their sight. Standards of admission to sight-saving classes in different cities are not in exact agreement; moreover, each case must be given individual consideration. Several general groups, however, may be mentioned for whom adjustment should be made, whether or not they have the opportunity of attending a special sight-saving class. These groups are as follows:

(1) Children whose vision ranges between 20/200 and 20/70 in the better eye after correction.

(2) Children who have progressive myopia (nearsightedness), although glasses may make the vision nearly normal.

(3) Children with diseases of the eye which cause irritation.

(4) Any other children who in the opinion of the oculist would benefit by special sight-saving methods.

Ordinarily children whose eyes have been corrected to normal vision by glasses or by medical procedure should not be counted as having defective vision. It is primarily when glasses or medical service fails to bring the needed relief or correction that the child becomes a candidate for a sight-saving class.

The alert teacher is always watching for any physical disability which the pupils in her classroom may manifest, including defective vision and diseases of the eye. Some of the symptoms associated with eye difficulty are: Frequent mistakes with figures or words; inability to study without discomfort; complaint of headaches and watering eyes; peculiar head positions; ability to see objects at a distance more clearly than those at close range; inability to see objects at a distance; inability to pass a satisfactory test with the eye chart.

Diseases of the eye are indicated by such symptoms as redness and swelling of the lids, congestion of the vessels of the eyeball, discharges of tears or pus from the eye. Whitish or grayish areas on the cornea are signs of former damaging disease which may have affected vision.

### iii. The Teacher's Task in the Conservation of Vision and Prevention of Blindness<sup>10</sup>

*Beatrice McLeod*

Upon classroom teachers devolves a most important responsibility for children with defective vision, since the pupils are under their observation more frequently and for longer periods than under that of any other member of the school or health staff. To meet this responsibility the teacher should have information concerning the hygiene and care of the eye, the ability to recognize symptoms of eye and visual defects, knowledge of an accurate

<sup>10</sup> From Beatrice McLeod, *op. cit.*, p. 7.

technique for testing vision, and an appreciation of the treatment and educational provisions necessary for the care of children with defective vision.

#### iv. Curriculum Problems in Sight-saving Classes <sup>11</sup>

*Winifred Hathaway*

The purpose of any educational curriculum must be the same for all groups—"To make school life meaningful; to provide opportunities for social participation and personal responsibilities; to find and release resources and creative possibilities." It is evident that curriculum problems for sight-saving classes are concerned with adjustment rather than with the building of a new curriculum. The teacher's aim is so to adjust the regular school curriculum that her pupils will get the greatest benefit, with the least possible eye use.

The first step toward attaining this desired result is to divide the subjects into groups, those requiring close use of the eyes, and those in which the other senses may be used, either in place of the sense of sight, or supplementing it to a considerable degree. Certain subjects of the curriculum naturally fall into the first grouping—reading, writing, and arithmetic. But even these fundamentals of education may be approached from different angles in the normally seeing and in the partially seeing groups. In the former, reading is encouraged not only for informative purposes but for pleasure; in the latter, it must be confined almost wholly to the informational side.

Writing, also, requires close use of the eyes, but here again invention has come to aid. The touch system of typewriting offers a medium of written expression that makes communication possible with practically no use of the eyes. If the child is encouraged . . . to do his original work on the typewriter—spelling, composition, book reviews—he is freeing the sight . . . for other purposes for which he must use his eyes. Special typewriters with large type make it possible for the child to correct his own work, wisely spending his sight for short periods. That typewriting represents an economy of sight and of time for all pupils is being demonstrated by the fact that experimental schools are teaching it even to first-grade children.

The fundamentals of arithmetic require the reading and writing of numbers and the reading of problems. But here, again, invention has changed the whole aspect of teaching arithmetic. Adding, subtracting, multiplying, and dividing may now be accomplished by machine in much less time and with much less incidence of error than when done by human beings.

Social studies, history, geography, science, fall within the second group since they must be taught largely through the auditory sense.

<sup>11</sup> From Winifred Hathaway, "Curriculum Problems in Sight-Saving Classes." Addresses and Proceedings of The National Education Association, 70, 1932, p. 541.

3. THE CRIPPLED CHILD<sup>12</sup>*White House Conference*

The aim of these classes [for the crippled] . . . "to give every child the best physical condition it is possible for him to attain, the best education it is possible for him to assimilate, and to help him find his place for service in the world's work," does not differ from the educational ideal for normal children. But for crippled children highly specialized methods and services are essential to educational opportunity. For many children, early discovery of the potentially crippling disease or condition and prompt medical and surgical care will mean the complete removal of the physical handicap and restoration to the ranks of normal children. For others, even early and efficient attention cannot restore them completely to normal, and for these it is now widely recognized that academic education and vocational training must go hand in hand with scientific physical care for periods of months or even years. Some agency must assume responsibility for the lengthy and unremitting services required for each individual crippled child if the objectives of the educational program are to be realized for him.

Each community, either state, city, county, or rural district, undertaking to provide an adequate education of its crippled children is confronted by three major problems: (1) to discover the number of children who must have special facilities and services if their opportunities for cultural education and training for productive citizenship are to equal those of normal children; (2) to determine the best method of securing these special advantages to each child within the range of his mental ability and physical potentialities; (3) to finance the program of special education which is, of necessity, more expensive than that of the normal child in the same community.

No public school system can carry out the necessary complex program (entailing prompt discovery; scientific diagnosis; orthopedic, and aftercare treatment; academic education; social care and training; vocational guidance, training, and placement; with follow-up services in each special phase of care) except through the definite co-ordination of the activities of the medical, social, and industrial agencies of the community with those of the educational department. In addition the co-operation of a well-informed public working through lay groups of various types is necessary.

The necessity and value of basing the program of special education upon a thorough study of the needs and the resources of the given locality at the particular time is demonstrated by the various methods of approach and by the measure of success attained in solving these problems under widely different conditions in the several states and local communities.

Special educational facilities for crippled children provided by local public school systems in communities of different types include:

<sup>12</sup>From *White House Conference, Special Education: The Handicapped and the Gifted*, New York: D. Appleton-Century Company, 1931, pp. 19-20, 34-36.

Special schools, or special units in the larger cities  
Special classes in regular school buildings in small cities and towns  
County unit schools, or town and county combined, the rural children being  
cared for in boarding homes  
Transportation to regular classes in communities of all types  
Classes and bedside instruction in local hospitals and convalescent homes  
Home teaching for both city and rural children unable to be transported to  
classes.

#### 4. THE CHILD OF LOWERED VITALITY<sup>13</sup>

*Beatrice McLeod*

By children of lowered vitality we mean those who, because of weakening conditions, are not able to keep pace, physically, with normal children in their daily school life. These are chiefly children with the childhood form of tuberculosis, the anemic, the malnourished, and those with serious heart lesions.

Good air, good simple food, rest, and proper exercise in the right amounts are requisites for good health and growth. An adequate school health program should look toward their achievement on behalf of every child. This accomplishment will require the removal of physical defects, the development of proper health habits, necessary regular exercise, with sufficient rest to prevent fatigue. Children, because of the lack of one or more of these essentials, may develop certain conditions and diseases which classify them as children of lowered vitality.

The classroom teacher under whose direction these children may come can put into effect certain practices, such as rest, health habits, supervised play, and regulated diet, necessary for all types of children of lowered vitality. More rest and less activity are prescribed generally for tuberculous children and for all types of malnourished and cardiopathic cases than for normal children. Much can be done in the school through health education and the development of general health habits. The importance of these habits may be emphasized through daily health inspection, school lunches, and supervised play. Regular and proper home diet, midday school lunch supplemented by milk some time during the morning or afternoon should be supplied according to the need of the individual child, which will be determined largely by the seriousness of the case.

The home conditions and type of parental control have a decided influence upon the physical condition of the child. Some conditions affecting the health and welfare of school children can often be improved through the co-operation of all concerned, including the teacher, the visiting nurse, and the county home demonstrators.

<sup>13</sup> From Beatrice McLeod, *Children of Lowered Vitality*, Pamphlet No. 56, United States Dept. of Interior, Office of Education, Washington, D. C., 1934, pp. 7-9.



Special Educational Facilities for the Child of Lowered Vitality<sup>14</sup>

Beatrice McLeod

Cities maintaining special classes for delicate children, with an educational program adjusted to the physical condition of the child who is usually attending school while he is still receiving medical care, will assign each child to the class best suited to his needs, as recommended by the physician. While special classrooms or special schools for the delicate are not essential, many large cities make such provision. These rooms or schools are equipped for hot lunches, much air and sunshine, and rest periods.

In large school special classes for children with weak hearts may be formed, but such children can also be placed with other delicate children. They should be housed in rooms on the first floor unless an elevator is available. Provision should be made for frequent medical examinations, which are usually arranged by the health service of the school system. Where no such schools or classes are maintained, special arrangements should be made whereby individual cases may have hot lunches, rest periods, and frequent medical examinations.

## 5. THE SPEECH DEFECTIVE

1. Stammering and Stuttering<sup>15</sup>

Frank W. Thomas

The terms *stammering* and *stuttering* have been used synonymously by the lay public. Linguists differentiate between the two by using *stammering* to indicate hesitancy or embarrassment, and *stuttering* to indicate a stoppage of utterance due to strong emotional disturbance. For this discussion the term *stuttering* will be used according to the current usage of teachers of speech. It will be used to indicate *that condition in speech, characterized by an involuntary stoppage of utterance induced by, or accompanied in part or in toto, by emotional or neuromuscular disturbance, or a combination of both.*

Stuttering is referable to no specific cause. There is no constant physiological irregularity. It is intermittent in appearance and is generally associated with social attitudes and situations involving some form of emotional stress. Neither intelligence, sex, social status, physical stigmata, right- or left-handedness, nor any other (at present) discernable physical trait is of itself a constant factor in stuttering.

The physical manifestations of stuttering are:

- (1) Cramps of the diaphragm, larynx, or tongue, or of all three.
- (2) Tics, or muscular spasms of the face, particularly of the muscles controlling the eyelids.
- (3) General muscular tension throughout the body.
- (4) Glottal catches.
- (5) Gasping.

<sup>14</sup> From Beatrice McLeod, *op. cit.*, pp. 13-14.

<sup>15</sup> Written expressly for this volume.

Phonetically, there is a repetition of consonant sounds preceding vowels, difficulty in speaking words beginning with vowels, and special difficulty in emitting short vowels.

In delivery, there is a general irregularity of phrasing and a marked lack of rhythm.

Fear, while not a specific causative agent in stuttering, is frequently associated with it. Fear of stuttering frequently induces stuttering. New social situations in which a stutterer is ill at ease also increase the tendency to stutter. Likewise, periods of emotional stress are followed by periods of stuttering, even in patients who have apparently "been cured." On the contrary, when patients feel free from observation, when chanting or singing in groups, or when speaking to themselves, they experience a marked freedom from stuttering. Similarly, when stutterers are engaged in absorbing manual movements such as sewing, or tracing intricate patterns, they experience freedom from stuttering. In short, any activity which causes the stutterer to withdraw his attention from his speech lessens the tendency to stutter during that particular activity. Whether such activities lessen the tendency to stutter during periods when the patient is not so engaged is still a moot point.

The prognosis for stuttering is still vague. Some authorities believe that not more than 5 per cent of adult stutterers are permanently cured. Others maintain that upward of 90 per cent of cases of stuttering are curable. There appears to be a fair amount of agreement, however, that adults have fewer chances of recovery.

In addition to the disagreement as to prognosis, there is also considerable difference among professional persons as to who may properly treat cases of stuttering. Medical men, psychologists, psychoanalysts, neurologists, mental hygienists, orthopsychiatrists and speech teachers have at some time claimed stuttering for their specific fields. From time to time some members of these professions have developed theories of causation and techniques for treatment of stuttering and, strangely enough, have reported cures. If such reports emphasize anything, they show that no treatment or regimen is applicable or efficacious in a sufficient number of cases to warrant acceptance for general practice. In fact, it is reasonable to doubt whether the reported cures are really permanent cures, or whether the cases cured were really cases of stuttering.

The real cause for stuttering is yet to be found. In general, the most successful teachers of speech and professional men engaged in the treatment of stuttering adhere to no specific theories. They employ, for the most part, principles of psychology and mental hygiene. They attempt to make the patient comfortable and adequate in speech situations. They avoid all drills and techniques which emphasize stuttering. They attempt to adjust the entire personality of the stutterer, rather than to limit themselves to isolated vocal, phonetic or breathing drills and exercises. They realize that such exercises are, of themselves, useless, if not harmful. They realize too, that unless there is a reconditioning of the various aspects of the personality of the patient, a stutterer can never, rightfully, be pronounced cured.

Perhaps future students of stuttering will discover definite lesions or neurological disturbances as specific causes of the speech difficulty known as stuttering. Until then, however, psychology and mental hygiene must show the way.

ii. The Correction of Speech Defects<sup>16</sup>

*Frederick L. Patry*

It is estimated that approximately 4 per cent of the pupils in the elementary grades have speech defects which demand special attention. It has been stated by others that 18 per cent of school children and about as many adults are handicapped because of varying degrees and types of speech disorders.

The majority of speech defects may be corrected or greatly benefited. In order to bring about improvement we must first of all consider the facts and factors which pertinently bear on the causes of speech difficulties.

As in the case of all types of physical and mental disorders, we must consider the individual as a whole, functioning as an integrated unit. Something may go wrong on various individual or combined levels of the integrated person—for example, structural (organic), physiological (functioning of parts), or psychobiological (mentally integrated behavior). But, in any event, the person reacts as a whole and as such we must study him, including constitutional or ingrained factors as well as those of environment and experiences and the individual's reaction to them.

The treatment of speech defects rationally lies in the removal of the cause, or rather causes, since there are usually several causative factors at work. In the case of structural defects, surgical treatment may be desirable or necessary. Special attention should be paid to the ears, nose, and throat. Where functional difficulties obtain, we must pay particular attention to remedial speech work by good habit training in the proper use of the organs of speech and their accessories, as well as in giving attention to the environmental factors, such as the removal of stress and strain in the form of excitement, gratuitous criticism, or poor speech example in others.

The treatment of stammering or stuttering is based on a study of the whole personality. We must know the facts of the individual's constitutional equipment, his life experiences and reactions to same, especially those experiences which were highly emotionally tinged and which left an indelible impression, consciously or not, on the immediate center of awareness. Reliving of past experiences under critical guidance as in a "distributive analysis" is effective in desensitizing the sufferer of his "sore spots" which may be playing a leading role in causing the speech defect. In such an analysis we should pay particular attention to the person's attitude toward life, since we often find an immaturity of ambition and unwillingness to adjust to life as it is.

<sup>16</sup> From Frederick L. Patry, "How We May Help to Correct Speech Defects." *Educational Method*, 13, 1934, pp. 251-253.

Keeping in mind the above method of approach to an intelligent and comprehensive interpretation and treatment of various types of speech defects, let us formulate a few general rules which experience has found to be helpful in correcting such disorders:

(1) Gain the confidence, good will, and desire of the person to correct his difficulty. Convince and reassure him he can more or less get rid of his handicap if he is willing to put forth a persistent effort.

(2) Surround him with a sympathetic, calm, understanding, and encouraging atmosphere.

(3) Ignore his speech shortcomings and make occasion to praise and reward him whenever improvement takes place.

(4) Never correct him in the presence of others.

(5) Do not call upon him to speak before a group, but encourage him to volunteer.

(6) Urge him to relax his abnormal muscular tension and become at ease, then think the sounds before attempting to say them.

(7) Urge him to pronounce every word slowly, distinctly, and correctly.

(8) Writing the first letter of each word in a sentence will assist the stutterer to overcome the tendency to repetition of the first sound.

(9) Secure the co-operation of parent, teacher, and others in intimate contact with the child in not only creating an encouraging, sympathetic attitude toward the child but also in assisting him in practicing at home and at school special speech corrective exercises.

(10) Speak and study aloud during study periods, as silent practice is of little value in overcoming a speech defect. The use of a mirror will be of assistance in bringing about the proper use and position of certain end speech organs.

(11) Do not interfere with changing the function of the dominant hand, such as urging the left-handed individual to write with his right hand. Where ambidexterity or uncertainty exists as to which hand is dominant, note which hand is usually used to throw objects or to comb the hair. Make occasion to utilize to the full the same arm in various games and sports activities.

(12) Tactfully seek to give the individual an understanding of the causes and sources of stress and strain which contributed to the stuttering habit. Since these are largely environmental emotional factors, the individual should be assisted in gaining good habits of emotional control. The social environment should be devoid of a highly charged emotional atmosphere, and except in utilizing encouragement, praise, and reward, it should totally ignore the speech difficulty.

## III. The Mentally Different Child

I. THE GIFTED CHILD<sup>17</sup>*Helen Davis*

Whenever special provision is proposed for gifted children, particularly provision that tends to accelerate them beyond children of their own chronological age, there is certain to be some opposition raised by those who would have us believe that gifted children as a group are physically and socially immature, inclined toward "bookishness," and prone to show neurotic and psychopathic tendencies. Since the advent of widespread interest in children of superior endowment, no small amount of research has been devoted to ascertaining the nature of their nonintellectual traits. There are numerous studies in which teachers and investigators have rated superior children in various character traits; Baldwin, Terman, and others have made extensive investigations of the physical development of gifted children; Root and others have centered their attention upon the psychological traits of children aside from the strictly intellectual.

Contrary to popular belief . . . all these studies indicate that as a rule, the unusually capable child, instead of being a one-sided product, overdeveloped in one or two respects at the expense of all others, is really an all-round individual, not only highly endowed intellectually, but superior in moral, social, and personality traits as well. Cases in which these conclusions are not borne out are conspicuously few.

In practically every intensive study that has been made of gifted children some consideration has been given to their nationality, heredity, and home environment. The results of these studies agree closely with each other, and with the natural expectation that children of superior mental endowment as a group come from sound stock and from homes above the average. . . .

Another important outcome of the scientific study of gifted children has been to disprove the once commonly accepted belief that mentally superior children are physically inferior. Yates, Terman, Root, Woodrow, and others have shown that mentally superior children as a class tend to show earlier physical development than normal [that is, average] children. . . . Baldwin has figures to show that there is a tendency for physical and mental precocity to accompany one another. Teachers of gifted classes, in reporting upon the features that distinguish their groups from a normal group, frequently mention high average attendance as an outstanding characteristic of gifted children. . . .

The tendency to underrate the physical development of superior children has doubtless arisen from the administrative policy in our school of promoting children beyond classmates of their own chronological age, so that teachers

<sup>17</sup> From Helen Davis, "Personal and Social Characteristics of Gifted Children," in *The Twenty-third Yearbook of the National Society for the Study of Education*, Part I, 1924, pp. 128-132. Quoted by permission of the Society.

have been judging these children outside their own age groups, and pronouncing them "weaker" when as a matter of fact they are merely "smaller." In this connection the writer was interested some time ago in discovering that of the twelve or thirteen most accelerated children in the elementary grades of a certain city school system, only one pupil was found to be the smallest child of the group in which his mental ability had placed him. Reports from teachers the country over reflect what seems to be a general tendency for children of superior mental endowment to be of superior physical endowment as well. . . .

The opinion is frequently expressed that gifted children, when placed among those who are two or more years their senior, show evidences of social immaturity. However, the teachers' observations, and in the case of several studies, the answers of the children themselves to questionnaires, show that there is a strong tendency for gifted children to prefer older companions, or those equal to them in mental age. . . .

There is at hand sufficient experimental evidence to show that superior children mingle easily with other children and, as a rule, show little difficulty in adjusting themselves either to an older or to a younger group. There are, no doubt, gifted children who are egotistical, or absorbed in books to the exclusion of all other interests, or unsympathetic with associates of lesser abilities, but any sweeping statements to the effect that gifted children as a class possess undesirable social traits are unwarranted, because based upon conspicuous individual experiences. . . .

To speak of the mental superiority of a group of gifted children is perhaps sufficient to distinguish them for purposes of classification from their less fortunate fellows, but there are certain ways in which their superiority manifests itself that should be of special interest and importance to teachers. These characteristics may readily be grouped under a few main headings.

Most frequently mentioned, and most easily observed, is what may be termed their brilliance, or *ease of assimilation* and, as a rule, their quick reaction time—their ability to absorb the same amount of material in a fraction of time required by a normal group.

They are further distinguished for their *power of sustained attention*, their mental endurance, and their tenacity of purpose. . . .

Another mental characteristic which distinguishes them is their *intellectual curiosity and initiative*. They seem almost without exception to be of an investigatory turn of mind, to take the initiative in any intellectual undertaking and to be possessed of an omnivorous appetite for learning. . . .

*The ability to generalize* is another common trait of the group. They are logical, quick to grasp underlying principles, to observe and associate similarities, and to foresee results.

A gifted group is further characterized by *broad-mindedness*, tolerance, and a detached, impersonal attitude toward problems.

The gifted seem particularly competent in *self-criticism*. The ability "to know when they do not know" is often well-developed. . . .

As a group, the gifted are also more *imaginative*, they possess a keener *sense of humor*, and are especially gifted in *linguistic attainments*.

Contrary to the once prevalent idea that mental superiority manifests itself almost exclusively in an inordinate interest in reading, investigations are strikingly in agreement on the *versatility and vitality of interests* found among gifted children. A gifted child is not interested in one, but many things. . . .

Those who have been in close contact with gifted children frequently refer to their superior moral traits. Scientific measurements are, perhaps, not yet developed to the point where we can judge character surely and objectively, but there is doubtless some real foundation for the assertion that gifted children usually conform more readily to the moral and ethical standards of society, since the trait is so frequently mentioned as being characteristic of them. Root, for instance, says that as a group they are "traditional and orthodox," that they are "good conformists." Teachers frequently refer to their "higher standards," their "truthfulness," their "ability to govern themselves," to "assume responsibility," to "respect the rights of others." They speak of less cheating and copying, less tale bearing.

## 2. THE MENTALLY DEFICIENT CHILD

### 1. Delayed Mental Development in Children <sup>18</sup>

*Howard W. Potter*

Just as there are children who are below par physically—malnourished, poorly developed, prone to infections, etc.—so also are there children who are below par mentally. The former have difficulties due to inferior physical equipment. The latter are prone to have difficulties chargeable to the mental side of their make-up.

When we consider the importance of intelligence, what it means to the individual, the race, and civilization in general, it becomes quite evident that there is need for just as careful attention and thought to the mental aspect of the child's life as has been generally given to the physical side. It is true, by promoting the physical health of the child, the mental health in many instances profits as well. On the other hand, there are many cases in which special measures, in addition to those used in promoting physical health, are required to facilitate the adjustment of the child suffering from mental retardation.

Mental retardation occurs under various circumstances. Two cases are rarely alike in all of their manifestations. In some the retardation is very marked; in others, very slight. In one instance the retardation may be fixed, while in another case it may respond quickly and favorably to appropriate management and treatment. Mental retardation may be part of a physical

<sup>18</sup> From Howard W. Potter, *Delayed Mental Development in Children*, Mental Hygiene Pamphlets, No. 8, State Dept. of Mental Hygiene, Albany, New York, pp. 1-4.

handicap, it may depend entirely upon environmental causes, or upon mental origin of emotional nature.

The younger the child the more difficult it is to recognize mental retardation, especially retardation of the milder sort. An infant who is unable to hold his head erect at six months, who fails to sit alone at ten months, who has not walked at eighteen or twenty months, and has not talked at two and one-half or three years of age, should be investigated from the standpoint of his mental development. Unusual docility or unusual fretfulness in the face of good health is sometimes an early symptom of mental retardation. Lack of inquisitiveness and failure of the characteristic investigative activities to appear before the age of two and one-half or three years suggest possible mental retardation.

From the ages of three to five, failure to learn by experience and to acquire reasonable obedience in the face of average good training is likely to indicate faulty intelligence.

The best indicator during the school period is the child's progress in his classes. Repeated failures in school and inability to keep up with his grade certainly require investigation. The average child of six years does first grade work; seven years, second grade; eight years, third grade; etc. A child two or more years behind in his schoolwork is often, although not always, mentally retarded.

Mentally retarded children often have difficulty in getting along with playmates of their own age; there is a tendency for them to play with children younger than themselves. They are often teased and "picked" on by the other children and are sometimes behavior problems in the home and school. They are apt to display a lack of that characteristic initiative, brightness, and alertness of other children, although such traits may not be so noticeably lacking except in outstanding cases of mental retardation.

Mental retardation is sometimes found to be associated with some physical disorder or handicap. Intelligence does not function at its best when physical distress or discomfort is present, or when the physical state is below par. Hence a chronically ill child or one afflicted with a condition attended by physical discomfort is apt to show signs of mental retardation in addition to the physical manifestations of his condition. How successful efforts may be in eliminating the mental retardation in such cases depends on how long standing the physical condition has been and to what extent it can be remedied. Physical conditions affecting the brain are especially apt to be accompanied by mental retardation. In such cases the mental retardation will, in all probability, be permanent.

Children who have severe defects of vision and hearing are apt to be retarded in school and so appear mentally retarded. A child who is so handicapped is unable readily to get along in ordinary surroundings, and his responses are apt to be dull, incomplete, or inconsistent.

Diseases or disorders of the ductless glands upset the body chemistry and in some instances give rise to mental retardation.

Worries, fears, emotional conflicts, and unhappiness caused by lack of



harmony with parents, brothers, sisters, playmates or teachers may interfere with the efficiency of intellectual processes. . . .

There are biological or natural differences in intelligence, just as there are natural variations in stature or physical build. Some children, because they are so constituted, may be slightly retarded mentally, although not to such an extent that they are absolute failures. It is not advisable for parents of such children to visualize for them higher education or to force them into it. True, by dint of much "cramming" they may eventually succeed in obtaining some parts of a higher education, but often not without damage to their personalities.

It is found that many mentally retarded children tend to be "manually minded" rather than "book minded." Such children may have sound judgment and common sense, and eventually, if properly educated, may become successful. The course to follow in this situation is to avoid fitting a square peg into a round hole. It is often possible to recognize such difficulties in children and hence avoid forcing the wrong kind of education upon them.

Educational measures depend upon the degree of mental retardation. For children of the preschool period who are only slightly retarded, prekindergarten and kindergarten forms of handwork and the simpler forms of manual education tend to develop the mind through training muscular control and co-ordination. This work also gives the child the desired means of self-expression.

For mentally retarded children up to the ages of eleven and twelve years, formal classes should be shorter than the usual sessions and interrupted by periods devoted to recreation and manual work of different types.

As such children grow older, formal school work should be modified, if retardation persists, so that the teaching of practical things may be included in his curriculum. Manual instruction, shopwork, and other forms of physical education are of invaluable service to many children of this class.

## ii. Criteria of Mental Deficiency<sup>19</sup>

*Edgar A. Doll*

The scientific difficulty encountered in the practical diagnosis of mental deficiency as feeble-mindedness is in the lack of precision surrounding these criteria of (a) social incompetence, (b) intellectual inferiority, and (c) arrested development. There are no precise scales or even limiting definitions to determine the points at which social inadequacy is recognizably separate from social adequacy. Social efficiency is influenced by social opportunity and by the exigencies of time and place, and the general economic condition of society in general. This reflects the difficulty long ago formulated by Binet that a person may be competent in the country but not in the city, or may be inadequate to the station in life to which he has been born.

<sup>19</sup> From Edgar A. Doll, "Criteria of Mental Deficiency." *The Psychological Exchange*, 3, 1935, pp. 209-214.

In the same way, the precise amount or kind of intelligence requisite for self-sufficiency has never been determined. There is a futile tendency to fix these intellectual limits for social adequacy at a definite limit, such as I.Q. seventy or mental age ten. As a matter of fact, social success being contingent on many factors in addition to intelligence, the intellectual limits for social adequacy are represented in a border zone rather than a border line. This border zone is in fact so broad as to extend from I.Q. fifty to I.Q. eighty-five, and from Binet mental age seven to Binet mental age twelve, so that for practical purposes the intellectual criterion as commonly applied in the use of Stanford-Binet measures alone is of doubtful value for distinguishing the socially inadequate of border-line intelligence from the socially adequate. When battery tests are employed, the impropriety of this procedure becomes readily apparent.

Similarly, the criterion of arrested development is difficult to apply because the developmental schedules of genetic psychology are extremely vague and break down at those points at which they are most needed, namely, the preadolescent age period from, say, eight to fourteen years. Moreover, while there can be no doubt that mental deficiency is a developmental defect, we lack precise evidence regarding the details of this retardation as seen in the course of all ages.

We are therefore in the embarrassing position of having a descriptively limiting definition of mental deficiency based on criteria which cannot be precisely applied in diagnosis. Thus, we define the condition in one set of terms and determine it in another. To be sure, the Binet scale is reasonably adequate for the measurement of intelligence in quantitative terms, but the limiting values of these mental ages (and their corresponding derivatives) for deficiency and normality are largely conventional or empirical. As a matter of fact, the evidence is ample to show that the high-grade socially inadequate and the low-grade socially adequate are found within the same Binet mental age of eight to twelve years, so that within this range the intellectual criterion alone cannot be sufficient for differentiating these two conditions. . . .

What is the upper mental age limit of feeble-mindedness? When the Binet scale was first applied to institution populations of feeble-minded composition it was discovered that few of the feeble-minded "tested" above the mental age of twelve years. Committing the logical fallacy of the obverse, it was then concluded that persons testing below Binet mental age twelve were feeble-minded, and this concept was actually written into the California law. It remained for psychological examining in the U. S. Army to reveal this fallacy when it was found that the upper mental age limits of feeble-mindedness were by no means the same as the lower mental age limits of normality. In the Army it was found that many persons who unquestionably were not feeble-minded "tested" as low as mental ages ten, nine, eight, and even in some instances seven years. In the main, these mental ages were measured with reasonable adequacy. Allowing for the question of differential standards according to nationality derivation and color, there is ample evidence to show that

the range of intelligence between mental ages eight to twelve includes both the feeble-minded and the subcultural normals. All efforts, therefore, to determine whether the upper limiting mental age for feeble-mindedness is nine years, ten years, eleven years, or what not, is irrelevant (and obviously the same arguments apply to given I.Q. limits, since the I.Q.'s are merely derivatives of mental ages), because intelligence level alone is not a sufficient criterion of deficiency or normality.

Aside from the problem of diagnosis it is frequently of much practical and scientific importance that the individual diagnosed as mentally deficient be further classified as of the primary or secondary type, that is, as of hereditary vs. nonhereditary origin. Competent diagnosis usually includes an attempt to establish etiology, since classification, prognosis and treatment are gravely influenced thereby.

The question is frequently raised whether mental deficiency is a clinical entity. If one means by this whether the feeble-minded are all alike or whether the condition is always due to the same cause, then the answer must be "No." There are feeble-mindednesses rather than single conditions of feeble-mindedness from this point of view. If, on the other hand, one means by clinical entity that the individuals classified as feeble-minded resemble each other rather generally in respect to a number of common basic characteristics, then the answer is unquestionably "Yes," for they are all socially incompetent, educationally limited, intellectually subnormal, arrested in development, similar in general level of behavior, in need of supervision, and so on.

The usual etiological dichotomy is based on hereditary vs. nonhereditary causation. By hereditary is meant plausible evidence of familial transmission (not merely familial coincidence) and relative freedom from postnatal or post-conceptual pathology or anomaly. Hereditary mental deficiency is therefore considered as of germ plasm origin, although this concept itself covers a wealth of ignorance.

Nonhereditary or postconceptional mental deficiency includes a number of special conditions commonly referred to as clinical varieties, such as the birth injured, the mongolian, the endocrinopathic, the neurological accidents, the developmental anomalies (such as microcephaly and hydrocephaly), the nutritional deficiencies (avitaminoses), the infections (toxemias), and the organic pathologies. This group of secondary mental deficiency, therefore, includes a variety of biological accidents, or misfortunes, or anomalies, and these developmental conditions produce peculiarities or vagaries in addition to the essential mental deficiency which make it possible to classify the different clinical types of mental deficiency for treatment or study purposes. These etiological classifications are necessary for the further scientific study of the subject, for we now have progressed to the point where the validity of certain types of scientific inquiry is in question because of attempting to apply universal concepts to diverse categories.

In point of numbers the proportion of neuropathic ancestry in institutional groups has been estimated by Tredgold to be present in as many as 90

per cent of all instances. The more demonstrable evidence yields estimates of approximately two-thirds of all cases as hereditary. More rigorous studies, however, reduce the estimates of hereditary cases to around 40 to 50 per cent, leaving the previous estimates of postconceptional case unaffected and introducing an "unclassified" or "unknown" group for the remainder. Thus, a reasonably careful study of the Training School population places the quotas as approximately 40 per cent unknown, or unclassified, 30 per cent secondary or nonhereditary, this 30 per cent being composed of 10 per cent special diseases, 8 per cent birth injured, 7 per cent mongolian, 3 per cent metabolic deprivation, 1 per cent trauma, and 3 per cent mixed.

There have been numerous attempts to define the nature of mental deficiency. The most generally accepted motion is that mental deficiency represents a general tendency toward infantility, and the evidence indicates that this is reflected in anthropometric, organic, nutritional, educational, social, dispositional, and intellectual traits. Although both gross and microscopic studies of the structure of the central nervous system reveal no very striking facts, it does seem that both in the number of brain cells, and also in their elaboration, there is marked underdevelopment. Studies of metabolism, size and position of organs, digestive metabolism, reasons for hospitalization, susceptibility to disease, causes of death, and so on, all reflect the imperfect evolution of the organism as a whole. Similarly, social, educational, and psychological studies reflect the infantile character of the adaptive behavior of the feeble-minded. Indeed, the success of the mental age classification of the feeble-minded is due to the remarkable correlation of structure and function so commonly observed among the mentally deficient, in consequence of which the mental age measure is almost universally used as a central index of the composite nature of this developmental defect. This does not mean that the feeble-minded are all alike, nor does it mean that they are evenly developed throughout their various organic systems and in their behavior correlates. On the contrary, the same individual differences of development as are observed among normal children and which represent differential rates of growth for different organ systems and behavior correlates are observed among the feeble-minded in exaggerated form.

These qualitative differences in development suggest the importance of not restricting the subdivisional classifications of the feeble-minded to mere mental age groups. Idiocy, imbecility and morosity are not mere stages on the same scale. On the contrary, it seems clear that idiocy is qualitatively as well as quantitatively differentiable from imbecility as contrasted with morosity. Thus idiocy represents a relatively heavy influence of postconceptional etiology, while the typical moron is a product of heredity, and these differences in etiology are reflected in behavior as well as in constitutional make-up. . . .

On the descriptive side, likewise, mental deficiency represents much more than is commonly included in the mental age system of diagnosis and classification. The feeble-minded are not merely subnormal normals. The inferior amount of intelligence is accompanied by certain differences in kind which are

readily recognized by those who have lived with the feeble-minded, even though these characteristics have not been satisfactorily formulated. These qualitative behavioral characteristics are clearly present in the early observations of Binet. As Binet long since said, the feeble-minded are lacking in common sense or good judgment, and as Goddard has added, they are weak in social relations. . . . They lack ability to discriminate and form judgments, to look ahead, to foresee consequences, to make plans, to learn from experience, and to control and co-ordinate behavior in accordance with such plans and with the requirements of the community. These essentially qualitative aspects of mentally deficient behavior have not yet yielded to satisfactory scientific evaluation in spite of numerous special tests designed for the purpose, so that for the present the diagnostician must rely upon his own capacity for observation and interpretation in relation to his personal experiences and to his associations with known instances of clear-cut deficiency.

### 3. THE MENTALLY DISEASED CHILD

#### i. The Dementia Praecox Child <sup>20</sup>

*Winifred Richmond*

[This] type of child . . . is well known to every primary teacher of experience and to every child guidance clinic. He is a behavior problem, incorrigible in the literal sense of the word, perhaps engaging in cruel and senseless conduct, showing no regard for punishment and incapable of bringing reason to bear upon his problems. He may be weak-willed, easily led, lacking in energy and appearing lazy; or he may be stubborn, ugly-tempered, and solitary. Indeed he seldom, if ever, makes normal social contacts; he is the "queer" and "different" child in the family, and his mates are apt to fear or deride him. Reality is to him not something to be adapted to, but to be avoided or run away from, and so we find him a truant from school and sliding out of responsibilities at home, for no good reason. [It is impossible to come into real contact with this type of child who, unlike the psychopathic child, gets up the semblance of rapport at least.] He lacks the low cunning of the psychopath, and instead of impressing his teachers as capable if he would only apply himself, as the psychopath does, he impresses them as dull or defective. He learns slowly, and sometimes appears incapable of learning at all. However, when psychometric tests are applied he is not noticeably behind. This is the type of child who in clinics after the Vineland tradition is diagnosed as "potentially feeble-minded." Vineland [and] other institutions of the training school type have observed such children, often impossible to care for in the community, settling into the institution regime, and showing more or less rapid mental deterioration, until a level was reached well below the border of normality, so that in adult life they do indeed appear to be mental defectives.

<sup>20</sup> From Winifred Richmond, "The Dementia Praecox Child." *The American Journal of Psychiatry*, 11, 1932, pp. 1154-1156; 1159.

But surely the term "potential feeble-minded" is a misnomer. By definition feeble-mindedness exists from birth or from an early age, and we distinguish it thus from the mental enfeeblement which may follow upon a mental or physical illness. An individual who in his childhood showed little or no degree of mental defect as measured by standardized tests can scarcely be called feeble-minded in the strict sense of the term.

The child guidance clinics and research centers differentiate this child from the mental defective on one hand and from the psychopath on the other, and are apt to consider him a constitutional inferior; if his behavior is bizarre enough he may even be diagnosed psychotic or at least prepsychotic. Since in early childhood his intelligence appears to be developing normally, much work is apt to be done with him, and his inability to learn ascribed to special disabilities or emotional conflicts and indeed he sometimes responds to such intensive treatment for a while at least. As he grows older it is evident that he is dropping back into the "dull normal" group, and his difficulties in adaptation become more pronounced. Disaster of some sort usually ensues; he becomes a petty criminal, a vagrant or hobo, or he makes a grand gesture and joins the army or navy, where the discipline soon breaks him completely and he is hospitalized. The girl becomes delinquent or so difficult that her family seeks advice and she too may find her way to the hospital, or to an institution for the feeble-minded.

In the last ten years, working with patients in St. Elizabeth's Hospital the writer has been struck again and again by the histories similar to the above, sometimes in cases with frank psychoses, and again in those who appear more defective than psychotic. . . . Almost invariably they are considered to be of poor intelligence, and are often diagnosed mental defectives, with or without a psychosis superimposed. Careful psychological examination, however, tells a different story. Either these patients are still capable of rating considerably above the border line of mental defect, or it is quite evident that they were formerly able to do so. Their dullness and stupidity, their poor judgment, their foolish or delinquent behavior, their inability to progress in school, are not due to any native lack in intelligence itself, but to the *praecox* process, which has been active for a very long time, even from childhood, and which results finally in permanent impairment of intellectual functions; indeed, are we not justified in saying intellectual deterioration, since these patients remain on a lowered intellectual level for the rest of their lives, without the temporary improvements or the flare-ups of interest and activity that many old *praecoxes* show, even after years of hospital residence. . . .

Briefly, then this is my thesis: Intensive study of children and adolescents, with the better psychological and psychiatric tools now in hand, is accumulating evidence to suggest that there are cases in which a deteriorating process, called *praecox* for want of a better term, is at work from early childhood. These cases are often thought to be mental defectives, but they are fairly easily differentiated from actual defectives. Their intelligence at first develops *part passu* with their chronological age, but later it begins to slow down, and in

adulthood they are on a lower level than the I.Q. promised in their childhood, and they remain on this level the rest of their lives. They seem to undergo a deterioration comparable to that which takes place in the organic psychoses.

## ii. Mental Pitfalls of Adolescence<sup>21</sup>

*Henry R. Stedman*

*Nature of the disease.*—Adolescence, by far the most critical period of mental life, extends approximately from the age of fifteen to that of twenty-five. It is in this developmental period, usually towards the end, that dementia praecox, the form of mental disorder which is peculiar to youth, begins. It only rarely happens that it originates later than the completion of adolescence, although in some individuals full mental maturity is not reached before thirty. Its name is derived from dementia, which denotes deterioration of the mind through loss of mental power, and praecox, premature. In its essence it is an enfeebling of the previously healthy mind, a slow decline of mental strength through gradual weakening of the will and deadening of the emotions. It ends, generally, after a few years, in permanent degeneration of the mind, sometimes light but more often pronounced and involving it in more or less complete disorganization. At the outset and throughout the course of the disorder may occur various kinds of mental disturbance appearing as "attacks," such as maniacal excitement, melancholic frenzy, simple depression, states of bodily rigidity (called catatonia), stupor, confusion of ideas, and delusional states. Hallucinations, such as seeing or hearing nonexistent sights or sounds, and sudden impulsive acts of homicidal or suicidal violence, are not uncommon. These manifestations do not all occur in the same attack although several of them may be combined in a single case.

The disease has been divided into several different subvarieties, but I will call attention only to the simple form which, because of its mild nature, is more frequently met with outside the hospital. The other pronounced and severe types need no further mention. The cases of simple dementia are far less striking and very insidious in their development. The principal feature is change in the youth's character, in the shape of a gradually developing mild apathy and indifference. If in good circumstances, he usually spends his life in indolence, varied by spasmodic and aimless activity, and tends to develop obsessions, antagonisms, and antisocial proclivities. The poorer patient so afflicted is often a tramp, a crank, a criminal, or a prostitute in the making. The "hobo" class is largely recruited from these mental derelicts. . . .

. . . The early indications of the disease, which appear gradually, as a rule, are practically the same whatever form it may afterward assume. In all my cases, in which intimate knowledge of the earliest manifestations was attainable, lapses in the power of attention—of mental concentration—have come first. An ambitious student complains: "I cannot any longer wield my

<sup>21</sup> From H. R. Stedman, *Mental Pitfalls of Adolescence*. New York: The National Committee for Mental Hygiene, Inc., 1928, pp. 3-5, 8, 13.

mind, which has become my master instead of I being master of it"; "I feel no exuberance as before"; "Everything is a dead weight"; "The feeling clings to me and I cannot fight it off." A bright lad, taking high rank in a preparatory school, grows despondent at finding himself becoming "dull," "stupid," and "weak," and begs to be helped, as his utmost endeavors to go on have failed. The girl in this situation feels for the first time that she "must *struggle* to be like other girls." The patient also becomes more easily fatigued physically than before and loses directive energy and initiative. With increasing mental failure the fruitless efforts are soon abandoned, the mind becomes more inactive, forgetfulness, depression, and indolence replacing alertness, ambition, and energy. He "wants to be let alone," becomes listless, apathetic, and careless, gradually slipping into a dulled condition of mind. Many become over-conscientious, depressed, and self-reproachful. Avoidance of others follows and paves the way for suspicion of those about them, the starting point, it may be, of future hallucinations, delusions, and overt acts. Suicidal thoughts may now appear. Adolescent patients of another type, when no longer able to meet even the minor demands of life, and physically fatigued, become easily upset and very irritable, as well as unexpectedly fault-finding and very angry over trifling matters. Marked indecision and constant demand for [reassurance] regarding the plainest matters of duty are common.

The train of thought naturally becomes interrupted early and may even show signs of the approaching mental confusion of the next and active stage of the disease. Lapse in judgment is shown in the development of unnatural prejudices, sudden and needless alarm at ordinary occurrences. Some patients begin by worrying over their physical condition, believing that their bodies or some bodily functions have undergone a change. Self-control may be early undermined, and strange conduct follows, such, for example, as unnatural and even grotesque infatuations, indiscriminate proposals of marriage, etc.

Sudden and unexpected acts, forerunners of the more pronounced impulsive states of the acute stage, are common, such as exhausting walks with no object after a long period of idleness; unexplained destruction of belongings, etc. Unlooked for transitions of mood and the lack of depth in the patient's depression or anger, characteristic features of the disease through its entire course, are early manifestations, as are also inconsequential speech and aimless effort.

*The source of dementia praecox.*—Authorities differ as to the prime cause of the disease, one group favoring a physical, the other a psychic origin; but wherever its germ, so to speak, may lie, the character of the mental soil in which it takes root and flourishes and the conditions which excite it to full development are well known to the psychiatrist.

One of the profoundest, although more remote, influences in originating dementia praecox is the time of life in which the disease prevails—the period of puberty and adolescence, of growth, development, immaturity. Almost all modern writers on psychiatry, even those who lay special stress on the influence of faulty heredity, are fully alive to the great importance of this critical time



of life in fostering mental disease, and in all probability we shall have to seek for the real causes of its origin in the normal physical and mental variations of this period of development.

The precipitating causes are various, but for the most part are of the nature of exhausting influences—mental and physical strain. These are the most conspicuous and powerful of the exciting causes of the disease. Rapidly growing [boys] or girls in the humbler walks of life—apprentices, clerks, train hands, stable boys, mill operatives, domestics—often succumb to the exhausting effects of hard and continuous physical labor combined with long hours, anxiety, little sleep, insufficient food and in consequence disorder of nutrition. Insomnia and lassitude arise and mental breakdown follows, sometimes apparently without the aid of any predisposition to mental disease. Youthful volunteers not inured to military discipline and the hardship and dangers of active service also recruit the ranks of the youthful insane. Social strain in girls, with its attendant factors of malnutrition and fatigue, as well as banting, may precipitate mental breakdown in predisposed cases. Overstudy, of itself rarely productive of mental disorder, causes many a delicate girl or lad of the “shut-in” type to succumb to mental disease when poor circumstances increase the struggle for education. Rapid and excessive growth in height, without corresponding weight and proportionate development, is recognized as abnormal. It is not uncommon in this type of adolescent and may sometimes precede by a little the development of the disease. In these instances there is not sufficient alimentation provided to meet the demand of the growth of the organism plus excessive mental and bodily energy.

... The “shut-in” type of lad or girl, in which the disease takes root most frequently and quickly, should be generally recognized. It should become a matter of common knowledge that just as a special physical make-up or conformation may betoken tuberculosis, so there is in many cases of dementia praecox a particular kind of personality which favors its development and calls for precaution in the way of training, environment, and mental and physical hygiene. In families of the ignorant and unthinking these danger signals pass unnoticed, but intelligent people may learn the lesson and profit by it, if it be brought to popular knowledge as an accepted scientific fact.

#### IV. The Socially Maladjusted Child

The social maladjustments resulting from the acquisition of antisocial traits consist of *moral, mental, and emotional reactions* which exert a pernicious influence on the formation of the child's character. In popular terminology the antisocial problem child is usually designated by such terms as *delinquent, incorrigible, wayward*. In general the antisocial problem child is one who deviates from the normal standards of behavior because his conduct interferes with the rights of others, menaces the welfare of the community and prevents the fullest development and usefulness of the child himself. Antisocial conduct is the outward manifestation of faulty character development. The antisocial problem child deviates from normal social adjustment because of attacking or destructive traits which include many varieties of behavior and are found in all degrees of seriousness among children.

*Juvenile delinquency* is a *social and moral disorder* involving antisocial conduct which is evidenced through offenses *against morals, against property, against persons, and against the peace of the community*. The child is termed delinquent who, because of the antisocial nature of his conduct, has come into conflict with the law, either civil or moral. The delinquent fails to conform to the principles of morality, fails to respect the property rights of others, fails to take cognizance of the right of others to personal safety and security, fails to observe the social regulations made for the peace of the community.

### JUVENILE DELINQUENCY

#### i. Juvenile Delinquency and Crime Prevention <sup>22</sup>

*Frederic M. Thrasher*

The growing seriousness of the crime problem in the United States has focused the attention of the educated public from time to time upon the possibility of a more fundamental and more systematic attack upon the underlying causes of crime than has yet been attempted, and these later formulations of the problem of crime prevention and of basic crime prevention programs are closely related to the whole problem of dealing with juvenile delinquency.

The groundwork for this type of attack has now been prepared through the acquisition of important knowledge as to the origins of crime made available through recent scientific studies: first, that the origins of criminal careers are to be found in the social reactions of childhood and adolescence; and second, that the concentration of delinquents and criminals is to be found in typical, interstitial areas which are the characteristic breeding places of gangs, delinquency, and crime.

These two outstanding generalizations, based as they are upon well-authenticated facts, clearly indicate the point of attack for a major crime prevention program: namely, the behavior problems of childhood and adolescence and the malfunctioning of social institutions in the crime-producing areas. How may a practicable program of crime prevention which strikes in a basic way at underlying causes be formulated?

The problem is primarily one of dealing with social influences affecting predelinquents or potential delinquents in these areas of deterioration in such a way as to assure the development of wholesome personality and good citizenship. It involves many factors and many techniques, but the fundamental problem is one of synthesis of all methods which are known to be essential so as to deal consistently and completely with the total situation in a given delinquency area. This involves an inescapable program of social planning which is clearly suggested by any careful sociological study.

The gang is clearly a symptom of community disorganization. The gang, along with other personal and social factors in the interstitial area, plays an important part in the demoralization of youth and the facilitation of delin-

<sup>22</sup> From Frederic M. Thrasher, "Juvenile Delinquency and Crime Prevention." *Journal of Educational Sociology*, 6, 1933, pp. 500-502.

quency and crime. The solution of the gang problem, however, is intimately and inextricably bound up with the whole question of crime prevention as applied to all factors contributing to delinquency in such an area.

From our own analysis of the gang and of juvenile delinquency in relation to crime . . . the essential elements of a crime prevention program for a local community appear to be as follows:

(1) The general purpose: to achieve a comprehensive, systematic, and integrated social program for the incorporation of *all* children in the delinquency area . . . into activities, groups, and organizations providing for their leisure-time interests as well as all other normal needs.

(2) Means to the achievement of this purpose:

Concentration of responsibility for crime prevention for the local delinquency area in question (a problem of community organization).

Research to procure essential facts and keep them up-to-date as a basis for an initial and a progressively developing crime prevention program.

Utilization of services of a co-operation among all preventive agencies existing in the given community (a problem of community organization).

Application of the preventive program *systematically* to all children in the delinquency area of the local community.

Creation of new agencies . . . to supplement existing social organizations when and at what points definite needs are discovered which cannot be met by existing facilities (a problem of community organization).

## ii. Determinants of Delinquency in the Schools <sup>23</sup>

*T. E. Sullenger*

. . . The school has a great opportunity to serve as a clearing house for the direction and prevention of juvenile delinquency. . . . Most of the determinants of delinquency in the school are acts of omission rather than of commission. Opportunities for detection and prevention are woven into the fabric of the ordinary everyday function of public schools. Many of the behavior problems could often be met and judiciously dealt with in their early controllable stage if the teachers were trained to recognize the early symptoms of neurosis and antisocial tendencies. . . .

The adaptation of the school to the life of the child, and the harmonizing of the one to the other in such a way as to secure the greatest benefit to the child's individual and social personality becomes a worth-while goal. The failure of the school in this respect to meet the requirements of the growing child, especially the boy, makes it fraught with causative factors which become determinants of juvenile delinquency. The social contact problem in the school is very much the same as the neighborhood association. The play group is transferred from voluntary association to an involuntary one. The teacher has

<sup>23</sup> From T. E. Sullenger, *The Social Determinants of Delinquency*. Omaha, Neb.: The Douglas Printing Company, 1930, pp. 23-26, 28.

the problem of dealing with the child both individually and collectively. Each child has a different heredity, a different environment from anyone else, and the habits resulting from these differences are not the same for any two individuals. . . .

An important role of the school is the detection of predelinquents. Since our greatest task in dealing with juvenile delinquency is one of prevention, we must use every means possible to identify children, who, because of defective nature or nurture, show signs of unsocial or antisocial conduct. . . . We do not say that all delinquent tendencies can be detected and checked in our public schools. The home . . . has already wielded a mighty influence on the child before entering school, and of course continues to do so as long as the child remains in the parental home. It is a well-known fact that most schools are very inefficient, many of them being almost as inefficient as the homes when it comes to understanding the child. These schools are inefficient because they fail to teach their pupils the nature of the world in which they live, because they do not train them vocationally, because they fail to develop in them a love for suitable labor, and because they do not teach their subjects to the children in terms of everyday life. In other words, they fail to socialize and vitalize education. On account of lack of interest in their studies many pupils become truants, and some of them vagrants, and eventually graduate with a life of crime.

The school can easily discover children who are of the weak-willed, irresponsible type, who invariably behave as those with whom they are thrown. These same individuals in the school often become the gang members in delinquency dominated by autocratic leaders, if not properly handled. . . . Studies made in this field show that tendencies that lead to delinquency certainly appeared in the school life of the child. They also show an apparent inability on the part of the school to interpret the failure of the children, and, sometimes, even to recognize the failure. Conduct disturbances, like disease, may be classified according to their origin as environmental or constitutional, and in either instance some modification can be brought about by appropriate treatment.

There is already a very fair sense of social responsibility in our public schools in relation to physical health, but it should be just as strong in relation to the mental and social health of the child. The advent of the visiting teacher and child guidance clinics is a distinct sign of progress in this respect. . . .

Very much of juvenile delinquency is a result of ignorance of the legal rules and moral codes of society. The child does not always know what society expects of him. The interpretation of the laws given by the parents differ widely, due to their attitude and lack of knowledge of the purpose and function of the laws. In many cases the parents are antagonistic toward certain laws, such as the compulsory attendance law, prohibition law and others. Early in life the child acquires an unsocial, if not an antisocial attitude. The public schools have an unlimited responsibility, as well as a great opportunity,

to reduce and prevent crime by overcoming this social ignorance. The child should be taught what society expects of him and why. . . .

Many cases of delinquency have arisen from friction in the schoolroom arising from a curriculum poorly suited to the individual child. Ignorance of child nature and psychosocial influences play an important role. Rebellion and truancy follow friction, and thus there arises a disrespect for authority and conventions. It is not uncommon to find stealing, staying out at night, and sexual misbehavior associated with truancy. This relationship is easily understood when we realize that the truant boys and girls find great opportunity for associating with bad companions who are themselves usually truants.

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## EXERCISES

1. State what contribution each of the following has made to the psychology of abnormal and atypical children. State also the best-known work of each and the institution of learning, or research, or the agency with which each individual is associated.

L. M. Terman	J. E. W. Wallin	Clifford Shaw	P. H. Furfey
H. H. Goddard	Wm. Healy	L. N. Yepson	N. V. Scheidemann
A. F. Tredgold	A. Gesell	Adolph Meyer	P. A. Witty
E. A. Doll	Cyril Burt	R. Pintner	A. D. Inskip
L. S. Hollingworth	Frederick Thrasher	T. V. Moore	V. E. Dickson

2. Define the following terms used in the study of abnormal and atypical children, talented; gifted; mentally defective; schizophrenia; idiot; imbecile; moron; psychosis; delinquent; genius; retardation; lowered vitality; congenital word blindness; neurosis; re-education; probation; recidivist; audiometer; emotional stability; child guidance clinic.

3. Report on one article dealing with abnormal and atypical children from each of the following sources and give a summary of facts and viewpoints presented in the article: *Outlook for the Blind*; *Sight Saving Review*; *The Crippled Child*; *Volta Review*; *Journal of Psycho-Asthenics*; *Mental Hygiene*; *Journal of Juvenile Research*; *American Journal of Orthopsychiatry*; *Journal of Exceptional Children*; *Quarterly Journal of Speech*; *Journal of Educational Sociology*; *Psychological Ex-*

*change; Psychological Clinic; Training School Bulletin; Journal of Abnormal and Social Psychology; Pedagogical Seminary and Journal of Genetic Psychology; Journal of Educational Psychology; Child Development; Journal of Educational Research; Educational Trends.*

4. Consult the reference bibliography and report on one book dealing with each of the main classifications of abnormal and atypical children; the physically handicapped; the mentally different; the socially maladjusted.

5. What are the functions and tasks of the child guidance clinic and the visiting teacher in the prevention and correction of delinquency?

6. Distinguish between major and minor speech disorders.

7. Are reading disabilities always a sign of abnormality? Why or why not?

8. What are remedial speech procedures?

9. Give your reasons for establishing acceleration groups for segregating children into homogenous groups, or for enriching the curriculum as methods for providing an effective use of the gifted child's superior mental abilities.

10. What are the tasks of the school (1) in preventing dementia praecox (2) in training (in so far as it is able) the higher grade mentally defectives, (3) in forming character to prevent juvenile delinquency?

## CHAPTER XXV

### SPECIAL PROBLEMS OF CHILDHOOD AND ADOLESCENCE <sup>1</sup>

*Paul A. Witty, Northwestern University*

#### I. Introduction

The topic of this chapter is so broad and inclusive that delimitation is imperative. Special problems of an age range so wide are multitudinous and varied. Adequate discussion of them, indeed even citation, would require much more space than that which is available. The writer has chosen therefore to present only those problems which are general, conspicuous, and capable of amelioration or elimination through appropriate education. Hence, special problems are categorized according to certain ages at which, in our contemporary social milieu they have their onset or, at which, by their very frequency, they restrict development and limit growth. They are grouped as problems of the preschool child, of the child at the age of entrance to school, of the adolescent, and finally of the adult. Back of all these problems lie the social forces which engender and nourish maladjustment. For example, many children fail during the first year of school, not because at this time they exhibit limitations in background, or in ability, but because those persons who direct the school and determine the course of youth's action fail to recognize or to utilize children's vast growth potentialities. Instead, they perpetuate the "primary education fetish," oblivious, it seems, of education's true function; namely, to help all children to grow by extending and reconstructing their experience, to provide a setting wherein children's questions will be answered and their problems resolved, and to lead youth to happy, successful, and intelligent adulthood. The tragedy of the false goals and barren standards of education is well portrayed in a composite portrait of the typical adolescent—whose expression is stilted and whose intelligence is shaped to conform with the accepted pattern. It is further illustrated by the horde of misfits in our secondary schools, and by the thousands of unhappy, inadequate adults. Changing concepts in psychology and philosophy promise a new methodology by means of which education may become a dynamic and successful developmental process associated with rich satisfactions in experiences chosen in terms of unique individual variations. It is the hope of the writer that the chapter may lead teachers not only to re-evaluate many problems of the present, but also to conceive and to construct an educational setting wherein "problems" will be rarely encountered because attention to individual differences and needs will preclude the onset of some and the development of many.

<sup>1</sup> These selections afford useful supplementary material to that found in the conventional texts and in the parallel discussions found in the following: Skinner and Collaborators, *Educational Psychology*, Chapter XI; Gast and Skinner, *Fundamentals of Educational Psychology*, Chapter IV; and Pressey, *Psychology and the New Education*, Chapter V. Excellent texts in this field have been written by Jersild, Conklin, Garrison, Morgan, Curti, Cole, Pechstein, Arlitt, Norsworthy and Whitley, and others.



## II. Personality and Its Integration

I. PHYSIOLOGICAL BASES<sup>2</sup>*W. H. Burnham*

The most fundamental characteristic of normal human personality is unity, wholeness, integration. This integration appears in many ways. It is shown in the tropisms of plants and animals and in concentration of attention in the child and the adult. The general function of the nervous system is integration. Recent studies of the brain put emphasis also on the whole rather than any special part.

The fundamental character of integration appears likewise in the most elementary study of human personality. The wide range of individual variation here is well known from ordinary observation and numerous investigations. The background of these differences seems to be a difference of the whole personality, the integrated unity of mind and body. How far these differences are conditioned by the varied balance of endocrine glands we do not know. How far they are conditioned by functional and structural differences in the central nervous system we do not know. How far they are inherited, how far due to environment, we do not know. In any case they are deep-seated.

The deep-seated and fundamental significance of this characteristic of integration is emphasized by the presence of it even in cases of serious brain injuries. On the basis of recent investigations Lashley says:

"In working with animals and with human patients I have been more and more impressed by the absence of the chaotic behavior which we might expect from the extent and irregular form of the lesions.

"This unity of action seems to be more deeply rooted than even the structural organization. . . . There may be great losses of sensory or of motor capacities, amnesias, emotional deterioration, dementia—but the residual behavior is still carried out in an orderly fashion. It may be grotesque, a caricature of normal behavior, but it is not unorganized."

Thus both in animals and man, in the normal and the diseased, in the development of childhood and in the deterioration of old age, the integration of function appears. This fact, shown by experimental studies and by psychological observation, lies at the heart of mental hygiene and may well be made the starting point for personality studies.

## 2. PHILOSOPHICAL PREMISES

*W. H. Burnham*<sup>3</sup>

In recent years two philosophical writers especially have emphasized the significance of the concept of integration, Professor Dewey in an address, and

<sup>2</sup> From W. H. Burnham, *The Wholesome Personality*. New York: D. Appleton-Century Company, 1932, pp. 1-2.

<sup>3</sup> From W. H. Burnham, *op. cit.*, pp. 6-8.

General Smuts in his book on *Holism and Evolution*. In psychiatry years ago, Adolph Meyer did the same. And in hygiene Gesell emphasizes the unity of mind and body.

Dewey reminds us of the time when the arts, science, and philosophy were closely connected. The conspicuous trait of this period was the sense of wholeness. Every problem of mind as against body today illustrates the disastrous effects of the divisions that have since grown up.

Dewey takes for granted the unity of mind and body and uses such phrases as "wholeness of operation," "unity in action," and the like. The facts testify, not to an influence existing "between two separate things, but to a behavior so integrated that it is artificial to split it up into two things." But the traditional division is so deep-seated that we have no word to name body and mind in an integrated wholeness of operation.

"The conception of behavior in its integrity, as including a history and environment, is the alternative to a theory that eliminates the mental because it considers only the behavior of the mechanism of action, as well as the theory that thinks it ennobles the mental by placing it in an isolated realm."

On all sides, Dewey maintains, the artificiality of isolating mind and body is beginning to be seen. Knowledge and action, theory and practice, should be united, and even environment should not be divorced from behavior. In education especially is an important need of such an integration. The physician and educator alike should know the life history of symptom or habit with which he deals. Thus the question of the integration of mind and body in action is the most practical of all questions.

In a similar manner Smuts has emphasized this conception . . . of personality as the highest form of integration. To him it is "the most real of all reals."

Smuts, like Dewey, also laments the artificial distinction between the mental and the physical. Naturally enough personality has been analyzed into mind and body, and in the history of philosophy this division, he maintains, has caused confusion and often bizarre and morbid behavior in practice. But with the coming of science the integration of the factors in personality into one whole has occurred, with the wholesome attitude that body and mind alike are clean and healthy. It is the severance of body and mind that makes perversion and ignoble use possible.

Smuts realizes that different degrees of integration of the personality are possible; but the aim is the development of a free personality, which, according to him, represents the highest achievement of which any human being is capable, and to him wholeness and freedom are correlative expressions. The ideal is attained only when, by personal development, "harmony and internal peace have been secured." The ideal man is not devoid of passions and emotions that war against the higher tendencies; but they are controlled, and the discords of ethical life are composed because there is a harmonious correlation of higher and lower.

## III. The Organism-As-A-Whole

PROCEDURES IN STUDY<sup>4</sup>

R. H. Wheeler

There are certain general conditions under which conscious behavior occurs. *First*, the organism must be an intact, working unit; any injury or disease which destroys the unity of the organism results either in abnormal behavior or death. *Behavior, then, is the activity of an organism-as-a-whole.* What shall constitute a total organism, of course, varies within certain limits. For example, a man may lose both legs and still be a conscious, behaving organism. But there are certain systems of organs, among which is the nervous system, whose various parts can suffer only limited injury without incapacitation of the organism for any kind of conscious behavior. *Second*, the organism must be living in an environment which furnishes constant stimulation. By stimulation we mean the activating influences of physical forces or social situations upon the organism. Whatever the organism does as a result of this stimulation is called a *response*, and the specific mechanisms of response in man are the nervous system, muscles, and glands. With these bodily structures the human being sees, hears, thinks, fears, loves, hates, and carries out all forms of overt action such as locomotion, manipulation of objects, and talking. *Third*, from the time of its conception, the organism commences to grow and mature in certain definite directions which are laid down in the history of the species or race. The history of the species or race, which we call its *phylogeny*, is therefore a remote condition of behavior.

It is an error to conceive of any one science as an isolated, compartmentalized body of facts. Chemistry, for instance, involves a study of physics, and psychology is a *biological* science from the standpoint of the *individual*. If one is interested in explaining the bodily mechanisms underlying human behavior, one must seek their causes in physical, chemical, and physiological facts. If this is the interest of the psychologist he must study the human being not as a member of society but as an isolated organism. Moreover, under these circumstances, in order to ascertain the laws of behavior he must carefully isolate and control its various aspects one by one; this is the function of the laboratory. To anticipate a few typical problems of *individual* psychology: What are the bodily structures responsible for seeing, hearing, feeling, experiencing emotions, remembering, learning, and thinking? What are the conditions under which these bodily structures operate or fail to operate? What are the descriptive criteria of the activities just mentioned? From the standpoint of individual psychology how are these activities to be identified? What are the methods by which they can be isolated, measured and controlled?

Facts obtained from a study of isolated individuals do not furnish a complete picture of the human being, nor do they make it possible to predict and

<sup>4</sup> From R. H. Wheeler, *The Science of Psychology*. New York: Thomas Y. Crowell Company, 1929, pp. 3-4.

control more than a small amount of his actual behavior. Many of the factors which ordinarily govern his reactions are eliminated by segregating the individual for the purpose of specialized study; these factors inhere in his social environment. When for convenience the conditions of his behavior are limited by taking him into the laboratory *the resulting facts are significant only with respect to the limiting conditions*. Man should be studied, therefore, not only as a biological organism but also as a member of society. Then it becomes evident that seeing, hearing, remembering, thinking, "expressing" emotions, indeed all modes of behavior, are social as well as biological in their character. Among the many social situations which control behavior are the family, a host of social organizations, the crowd, national customs and traditions, religion, stratifications of society, public opinion, laws and forms of government. Both the individual and society are the sources of psychological information, but the student should not conclude that there are two kinds of psychology, individual and social. In the last analysis there is only one kind of psychology, one set of principles applicable to the behavior of conscious organisms, although there are various fields in which these principles apply and each field has its own unique and particular problems. These fields include animal, child, abnormal, individual, and social psychology.

#### IV. Continuity Rather Than Discontinuity Is Characteristic of All Development

##### I. CONTINUITY A CHARACTERISTIC OF GROWTH<sup>5</sup>

*F. L. Goodenough and John E. Anderson*

Although the current use of such convenient terms as "developmental level," "growth stages," "the period of infancy," "of early childhood," "of adolescence," etc., sometimes gives the impression that development proceeds by a series of rapid changes from one well-defined stage to another, it is important for the student to realize from the outset that no such series of marked growth changes exists in nature, and that the expressions which have just been quoted are nothing more than convenient terms for marking off certain parts of a continuous process for purposes of examination and study. The only reason for making such divisions at all is that the entire process is so long and involved that it is impossible to get anything more than a hazy idea of it unless we divide it up in some way and study it a little at a time.

In making such divisions it is customary and convenient to use as the division point the average age or time at which certain prominent events in the field under consideration take place. For example, persons interested in physical growth and development frequently make the following rough divisions: the *prenatal* period which is often further subdivided into the periods of the *ovum*, the *embryo*, and the *fetus*; the postnatal period which is divided into

<sup>5</sup> From F. L. Goodenough and John E. Anderson, *Experimental Child Study*. New York: D. Appleton-Century Company, 1931, pp. 19-20.

*infancy*, covering the time from birth to the assumption of the erect posture at about twelve to fifteen months, *early childhood*, lasting from about fifteen months to six years, *middle childhood* from six to ten years, *late childhood* or the prepuberal period as it is sometimes called, which lasts from about the age of ten to the time of puberty, and *adolescence* which extends from the age of puberty until the time when physical growth is terminated, that is, about eighteen in girls and twenty in boys. These divisions are convenient for the anatomist because, in a general way, they mark off periods of slow or rapid physical growth. During infancy and early childhood growth is rapid; during middle childhood it is much lower; during the prepuberal period the growth rate again becomes rapid, and following puberty it slows off gradually and continuously till the final adult standard is reached. The change from one period to another, however, is not abrupt but gradual and continuous. The educator may make a different sort of division, such as the *preschool* period, the *kindergarten* period, the *primary school* or *grade school* period, the *junior high school* period, the *senior high school* period, the *college* period, etc. Back in the nineties, when the recapitulation theory was in full swing it was fashionable to make a division of stages in child development along lines which were supposed to parallel the cultural history of the race. There was the "stone age period," the "cave man period," the "big Injun period," etc. Persons interested in the play behavior of children sometimes refer to the *running and chasing age*, the *baseball age*, etc. Play interests, however, like other developmental phenomena, come into being and disappear gradually. Although they may be more prominent at certain periods of life than at others, there are no sharply defined stages set off by their presence.

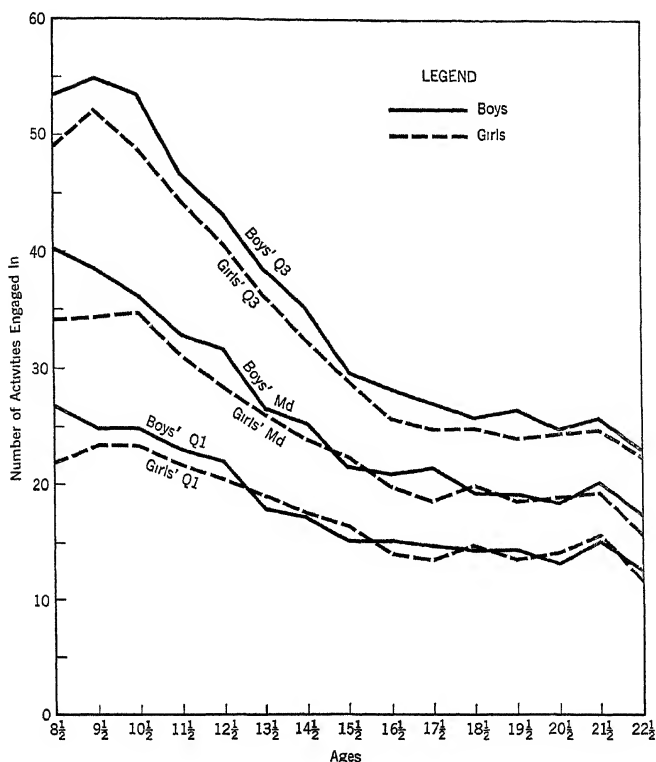
## 2. CONTINUITY IN PLAY ACTIVITIES

Hence one must reject the concept of periodicity since reliable studies demonstrate that gradual growth characterizes every human manifestation. This fact is vividly portrayed in the results of a large-scale investigation of play activities participated in by children and adults (Fig. 23).

The figure below resulted from studies of some 25,000 persons. It shows a continuity characteristic of and basic to every human activity. The shape of the curves differs with various traits, but the essential fact of continuity appears incontrovertible.

## V. Bases of a Modified Psychological Approach in Solving Special Problems

Every aspect of human activity may be involved in adjustments in which behavior is determined by the stresses of the interrelated whole organism in its attempt to resolve social problems or to adapt itself to environmental demands. Although it has been shown that there is a sequence in behavior patterns characteristic of man, it must not be assumed that hereditary forces alone actuate this progres-



From Lehman and Witty, *The Psychology of Play Activities*, copyright 1927 by A. S. Barnes and Company, p. 58.

FIG. 23—The number of different play activities engaged in by boys and girls of various ages. Average of findings from three separate investigations. Dispersion of the two middle quartiles also shown.

sion. Gesell has pointed to the reciprocal relationships of hereditary predispositions (inner growth or maturation) and to environmental influences.

"The intimacy of this relationship may not, however, prevent us from ascribing a priority and possibly even some preponderance to hereditary factors in the patterning of human behavior. . . . Environmental factors support, inflect, and modify, but do not generate the progressions of development. Growth as an impulsion and as a cycle of events is uniquely a character of the living organism and neither physical nor social environment contains any architectonic arrangements even analogous to the mechanism of growth."\*

\*Uniformity and regularity in human development are stressed in the writing of Gesell, which is supported by M. M. Shirley's study of the locomotor and visual-manual functions in the first two years of the child's life, "in which there is reported an orderly sequence of development from time to time: . . . the nature of the sequence indicated its dependence upon biological laws of growth." The quotation used above is from A. Gesell, *Maturation and the Patterning of Be-*

The foregoing point of view is supported by empirical observation to the effect that certain growth patterns of the human organism appear and reappear with regularity from generation to generation. Furthermore, the universality of some complex human wants (which are satisfied by closely knit reactions) appear to be actuated and sustained by inner growth (maturation). These patterns can scarcely be said to result from the universality and regularity of environmental stimuli. It would be dangerous, indeed, to overemphasize innate factors as the determiners of growth. Much human behavior appears purposeless and random (in one sense at least). Certainly it seems unwise to stress the role of *individuation* and to under-rate the importance of *integration* in the development of the highly modifiable human organism.\*

The following conclusion of Carmichael seems tenable: "... in regard to the related processes of individuation and integration, it seems that as yet, at any rate, it is better to record as unambiguously as possible the responses that can be made at any stage of development rather than to attempt to fit all development into one formula."†

There appears to be no sound reason for postulating a simple formula for human growth in the light of experimentation upon prenatal development. Nor can a simple formula be used to describe adequately the behavior of the newborn child. Karl C. Pratt, after examining 188 studies relating to the neonate concludes that "The newborn infant presents tremendous possibilities for development through 'maturation' and through 'learning,' but is not as helpless and ineffectual an organism as it is usually portrayed."‡ Some responses are highly integrated; others appear to be unorganized. The possibilities for modifiability are great at this time. Despite the rather conclusive evidence presented by Pratt and others, several writers continue to overemphasize the role of hereditary predispositions and of maturation manifestations. Therefore it is important that the student guard against acceptance of a "new" theory having implications tantamount to those associated with the "instinct theory" of human development.

Nevertheless we have demonstrated an essential continuity in growth patterns which precludes one's stating that either heredity or environment "determines" growth; undoubtedly the interaction of both is significant, and necessary for human growth. Few important patterns in human behavior can be attributed solely to inborn tendencies. Cumulative experiences modify growth; and, although this process is gradual, there are certain "critical" periods in an individual's life which have special significance.

*havior*, Chap. 4 in *A Handbook of Child Psychology*, second edition, revised, edited by Carl Murchison, Worcester, Mass.: Clark University Press, 1933, p. 211.

\* Coghill states: "The behavior pattern from the beginning expands throughout the growing normal animal as a perfectly integrated unit, whereas partial patterns arise within the total patterns, and, by a process of individuation, acquire secondarily varying degrees of independence . . . complexity of behavior is not derived by progressive integration of more and more originally discrete units." Quoted in *A Handbook of Child Psychology*, p. 142.

† L. Carmichael, *Origin and Prenatal Growth of Behavior*, Ch. 2 in *The Handbook of Child Psychology*, second edition, revised, edited by Carl Murchison. Worcester, Mass.: Clark University Press, 1933, p. 144.

‡ K. C. Pratt, *The Neonate*, Ch. 3 in *The Handbook of Child Psychology*, second edition, revised, edited by Carl Murchison. Worcester, Mass.: Clark University Press, 1933, p. 201.

VI. Crucial Periods in Life <sup>6</sup>*Mandel Sherman*

*The period between the ages of two and three.*—At this time the child has developed an understanding of language and has begun to react to other people through the medium of speech. He has discarded many of his original sensorimotor responses and through language has found a wider world. The personality traits which previously were adequate to adjust him must now be discarded or greatly modified. This is the time when he must be guided carefully, since the traits he develops during this period are of utmost importance in determining his future personality.

*The school period, when the child enters kindergarten or first grade.*—Many children are guarded so closely by their parents during early childhood that they are not able to modify their behavior readily in order to adjust to a wider social order than their home affords. Many traits which serve to adjust them at home are inadequate in a group of children of their own age. They find themselves in situations requiring "give and take," and are frequently confused by the behavior of teachers and fellow pupils which they interpret as antagonistic. An important function of kindergarten and first-grade teachers is to socialize the child when he first enters school.

*The adolescent period.*—As we shall see in a later chapter, adolescence is a period of social emergence during which the individual must readjust himself to an adult level of behavior. The adolescent is expected to be mature in his attitudes and behavior but at the same time is not supposed to think and act too independently. His desire to explore and take part in new experiences is frustrated by the domination of his parents. He is likely to become confused by his interests in a variety of new problems—social, educational, vocational, and the relation between the sexes. His emotional equilibrium and growth towards a rational maturity depend upon his ability to strike a balance between his efforts for independence and the restrictions imposed upon him.

*Youth—approximately between the ages of seventeen and twenty.*—A host of problems confront an individual during this period. If he enters college he must face problems of special training, choosing courses, the development of a mature philosophy, and so on. In addition he must adjust to new social problems with which he has had little experience. The youth who is earning a living by full-time work is also confronted by new and strange problems—adjusting to an industrial world, to a larger social group, meeting competition, and so on.

*The young adult.*—At times the problems of this period are more critical than those of any other period. The individual who has just finished college or a professional training is confronted with serious problems indeed. The achievement of economic security becomes a necessity. He must find a place in the social and professional world. Marriage and the problem of making a

<sup>6</sup> From Mandel Sherman, *Mental Hygiene and Education*. New York: Longmans, Green & Co., 1934, pp. 58, 59, 60.



permanent home must be considered. He is often spurred to activity because of the expectations of his family and friends, and may develop conflicts when he becomes dissatisfied with his progress.

*The crystallization period—variously estimated as occurring between the ages of 35 and 45.*—During this period the individual begins to take serious account of himself. In many cases he is disappointed because of his seeming lack of progress or because of real or imagined mistakes he has made. He has had many experiences and is through with "experimentation." The competition which he enjoyed as a youth or young adult no longer fascinates him and he longs for peace and security. The problem of economic security in old age arises and old conflicts are likely to reappear with added intensity. During this period most individuals adopt a definite philosophy of life which reconciles their previous experiences and efforts with their actual attainment.

## VII. Problems of Early Childhood

### I. FACTORS IN MALADJUSTMENT <sup>7</sup>

*John J. B. Morgan*

Morgan stresses the following factors as significant items in the maladjustment of young children:

1. Parental overdevotion to the child
2. Parental jealousy of child
3. Foster child phantasy
4. Projection of parental ambitions upon child
5. Sex preference by parents
6. Unfortunate sibling relationships
7. Improper child training in food and sleep habits
8. The child's emulation of parent's undesirable conduct

He then suggests that it is essential that teachers understand methods by which control may be effected.

### 2. METHODS FOR SOLVING PROBLEMS <sup>8</sup>

*John J. B. Morgan*

*Teach the child emotional expression rather than emotional inhibition.*—By emotional expression we do not mean laughing, crying, sulking, or any other form of expression indulged in merely for the sake of appearing emotional. These in themselves are all superficial. By emotional expression we mean doing something effective with the situation at hand. If a thwarting, irritating situation is at hand, it is a mistake to preach to the child to control his temper. Teach him to use the increased energy created by this thwarting to solve the problem.

<sup>7</sup> Condensed from J. J. B. Morgan, *Child Psychology*. New York: Farrar & Rinehart, Inc., 1931, Chapter V, pp. 127-155.

<sup>8</sup> From John J. B. Morgan, *op. cit.*, pp. 155-157.

This is equally true whether we, or physical objects, happen to constitute the problem. We preach control of the temper because we do not wish to have the child resist us. If we make ourselves an object of resistance we should expect to bear the brunt of emotional reaction. If we use positive methods we shall not get into such a situation.

*Give the child a joyous outlook on life.*—Children are naturally free, spontaneous, and happy. They may suffer physical pain at times, but usually they react to this very well and do not for that reason become morbid. If they do develop a habitual morbidity, it is because they are responding to the despondency of those about them. Children have a very keen ability to sense the emotional attitudes of those about them. It does not necessitate open discussion on the part of adults to give them the clue. In short, the way to develop a happy attitude in children is to be happy where they are concerned. The troubles of adults should not be paraded before children.

*Teach the child to love others.*—This can only be done when his contacts with people net him satisfaction. It cannot be accomplished unless he has ample opportunity to develop contacts with people, and it must be done in the positive manner. It is useless, after the child has been injured by someone, to tell him that he must love everybody. It is better to say as little as possible about such an incident but make sure that his future contacts are more desirable. Nothing is more important in emotional development than positive reactions to others.

*Teach him to live his emotions rather than to talk about them.*—Happiness, sadness, sorrow, hate, and love should not be subjects of conversation for children. Nor should they hear adults conversing about these subjects. Most of us talk too much about our emotions and live them too little. We go to see a sad movie to get the thrill of crying and then talk about it very glibly, thus teaching the child to be as superficial as we are.

*Teach complex forms of emotional behavior.*—There are adults who still cling to childish emotional patterns; they cry when they are thwarted, they want to be petted, they have temper tantrums, turn pale to attract attention, or do similar childish things. Complex forms are learned when we learn more about people and, with this knowledge, adapt our emotional expressions to forms which will gain a favorable response from them.

## VIII. The Role of the Home in the Preschool Years

### I. CREATING INDEPENDENCE IN PHYSICAL ACTS <sup>9</sup>

*Josephine C. Foster*

Preschool contacts with the school should assure a correlation of the home and the school programs and an adaptation of home life to the new requirements. The child must be gradually taught self-reliance, especially in personal

<sup>9</sup> From *White House Conference Reports, Home and School Cooperation*, 1932, by Josephine C. Foster in *Busy Childhood*. New York: D. Appleton-Century Company, 1933, pp. 264-266.

habits such as washing, dressing, and eating. His family relationships should create in him a friendly attitude toward adults, and in contact with other children he should be trained in adjustment to the group. . . . Continuous contact of the parent with the school is essential in the preschool years, so that there may be no break, but only development, as the child's horizon widens. The home is the first school, and should be recognized as such, and the parents must be trained, since they are inevitably the first and the only continuous teachers.

During the preschool years, the mother gradually should free the child from herself. The child should be trained to wash, dress, and feed himself. He should have experience with other children so that he is already adjusted to group life before entering school. An attitude should be created toward the school that will make the child eager to enter into this larger life.

## 2. CREATING INDEPENDENCE IN MENTAL ACTIVITIES <sup>10</sup>

*Josephine C. Foster*

The child who has had some practice at home with scissors and crayons and paste will not be at a loss when these materials appear at school. The child who has had opportunity for response to music enters more quickly and more fully into the kindergarten music hour. The child who has become accustomed to the use of the simpler pieces of gymnasium apparatus—swings, bars, ladders, and the like—is much more able and gets much more fun from the apparatus which he finds in the kindergarten. Training of this kind is offered in the best nursery schools, but it need not be omitted in the home if the parents are alert to their opportunities.

More important than any of these points, however, is the mental attitude which the child has assumed. The child who comes to school ready to try anything which is offered, confident that he can attain some degree of success in any reasonable undertaking, the child who is friendly, who has learned to take part in a conversation without monopolizing the center of the stage, who has learned to take turns, who relies upon himself, who takes some responsibility for his own toilet needs and for putting on his own wraps, this child is much happier and a much more valuable member of the school community than the over-bashful, clinging-vine, spoiled-baby type of child, no matter how appealing the latter may be to the doting mother.

## IX. Continuity of Preschool and School Experience <sup>11</sup>

*Paul A. Witty and Lou L. LaBrant*

If it is true that behavior involves the organism as a whole, and that small integrated units appear secondarily as a result of individuation, *the school must take cognizance of the continuity of the child's total experiences.* Unless

<sup>10</sup> From Josephine C. Foster, *Busy Childhood*, *op. cit.*, pp. 265-266.

<sup>11</sup> From Paul A. Witty and L. L. LaBrant, "Experimentalism and Its Relation to a New Psychology." *Educational Administration and Supervision*, 21, 1935, pp. 293-295.

we are to exploit intelligence, suffer enormous waste, and develop profitless activities which are, because of the child's experience, far from the adult meanings we assume, we must develop school situations directly related to and continuous with preschool life.

Before entering school the child carries on a succession of purposeful undertakings. The words he learns and the manual skills he acquires are a part of larger activities having immediate meanings and values. He should enter a school which is developed to continue his experiences and to enhance his understandings. Let us illustrate with the matter of language development. The preschool child acquires words because they are a necessary part of the larger activities of getting food, putting on clothing, going places, and gaining other desired ends. Words thus learned as parts of complex, meaningful experience expand in number and relation until we say the child has learned to talk coherently. These language patterns are highly efficient in terms of the child's stage of development, and, although they are related to the child's total development, they can be recognized as individuations having unity and coherence. They are individuations which have perhaps a relation to the child's total experience similar to that which dancing has to walking and finally to the whole neural and muscular co-ordination of the human organism. These early language patterns have been acquired only as they have had meaning in a larger setting. Far too often do we neglect this logical and natural order in the school situation. For example, instead of seeing language as an area in total experience, we confront the child with language as a foreign activity, connected with his general behavior only by the slender thread of the teacher's personality. He is given a symbol for, let us say, the word *dog*. Although he may have already acquired the spoken word as a name for his pet, he is asked to learn the written word to please the teacher, or because a picture of a dog is presented, or because he is told the symbol will help him to read. Such procedures neglect to utilize the child's intelligence which has already, before the school age, resulted in his acquisition of a vocabulary of some twenty-five hundred words and a large number of sentences with intricate relationships. To teach the reading of sentences rather than words may at first thought seem desirable, but this does not necessarily follow. The presentation of sentences may merely mean substituting a larger artificial unit for a small one. Reading, like speaking, needs to develop as a specialized area of a total meaningful situation in which reading makes a natural contribution. The word or sentence is then read because *it tells what the child wants to find out*. This is simply an illustration of the principle that the school must set up situations which are extensions, not violations, of integrated experiences.

Units of work, therefore, assume significance if they offer varied experiences which can be assimilated in, contribute to, or simply reflect the growth pattern. Since the world of experience is not static, reconstruction of continuous, meaningful group experiences is essential for growth. Wisely chosen group study *in the planning of which pupils participate* is consequently most likely to meet the school's responsibility. Such a program calls for readjustment

as the individual interprets his own learning in terms of group interest. Much of his development is therefore the result of social stimulation. There is a place in really comprehensive projects for the participation of all children who comprise a single school group.

## X. Learning to Read: A Crucial Problem of the Young Child <sup>12</sup>

*Paul A. Witty and David Kopel*

The temporal assignment of six years as the age of school entrance and therefore the time for beginning silent reading is becoming a "crucial" educational issue. Although several nursery schools and kindergartens have introduced some reading materials or "readiness" devices into their programs, most have assumed that it is more desirable to employ their time with activities relating to the immediate needs and interests of young children. In elementary schools, an ever-increasing number of first grades, and second grades (in rare instances) have either excluded reading from the curriculum or made it a very incidental process limited to those children whose mental and general maturity practically assures successful—largely uninstructed—learning.

Many opinions are emphatically advanced concerning the place of reading in the primary grades. Most educators urge its introduction during the first few weeks of the first grade, in the form of simple flash card exercises or drills in word, phrase, or sentence recognition. A second group assert, however, that any or all exercises should be postponed until children are mature enough to find relevance and meaning in silent reading activity. The first group believe that drills and specific "readiness" acquisitions are provocative of later and continuous success in mastering the habits and skills essential in effective silent reading. The latter claim that these typical reading drills are not consonant with the growth, interest, and abilities of six-year-old children; that their practice leads to the development of vague, partial, incomplete meanings and of attitudes inimical to successful and joyful reading; hence failure results for large percentages of children.

Children, however, exposed to the typical first-grade reading class do not, in passive fashion, merely waste their time: as dynamic organisms in a monotonously sterile, abstract and largely unintelligible situation, they frequently *react* with the development (learning) of attitudes of indifference to, or dislike for, reading. Easily fostered in this manner—in the urgency of adjustment to an uninteresting, frequently impossible, task—are other unfortunate concomitants—feelings of inadequacy, of inferiority, and of rebellion, which become manifest sometimes in "behavior problems." The constellation of emotional difficulties will vary, of course, with the individual. Doubtless, children's "general" dislike for school has its provenance in the curricular aridity first experienced in the primary grades.

Apologists for the traditional curriculum frequently assert that in the

<sup>12</sup> From Paul A. Witty and David Kopel, "Preventing Reading Disability: The Reading Readiness Factor." *Educational Administration and Supervision*, 31, 1936, pp. 401 ff.

primary grades the basic rudimentary skills are developed; these are essential in later, *meaningful* reading. Although they recognize the important outcomes to be "reading to learn" the primary aim, temporally, at least, is "learning to read." Hence the *total experience* of the child is not recognized if he is acquiring the proper habits and skills.

Indeed, educators now state that the *primary* objective of Grades I-II-III is "learning to read," which changes (suddenly in chameleon fashion) to "reading to learn" in Grade IV. We insist that such a dichotomy in educational thought is unjustifiable, for we believe that *every* experience introduced in school should contribute positively to child growth. (Moreover, all school experiences should reflect the essential continuity which inheres in *desirable* growth). Hence, reading activities, *whenever they are introduced*, should effect a natural coalition with knowledges which have accrued because society and self create and reflect situations in which language tools are demanded as phases of increasingly successful personality adjustment. Thus the first words are acquired because they tell what children must know in order to answer impelling questions of immediate expediency; no less relevant to the needs of the child should be his later experiences in language growth.

Recorded in several studies are results which indicate quite clearly that postponing introductory reading until materials can be grasped readily and assimilated in meaningful units (usually in the third grade) leads to superior mastery and sustained interest in silent reading. Lula Wright's work at Lincoln School suggests the value of postponing reading experience and of abandoning reading objectives in Grades I and II. Noteworthy, also, are the reports by Meriam (in Columbia, Missouri), Collings (in McDonald County, Missouri), and Tippet (in Lincoln School, Columbia University, New York) of *superior* reading achievement in experimental groups of mentally average children whose reading experiences in the first grade were few and incidental.

Why do so many primary children fail in *reading*? In numerous investigations one finds the same answer. Results of studies of nonpromotion in the first grades of Los Angeles and San Diego are reported by McLaughlin; they indicate that mental immaturity precludes success in reading for many children. Theisen cites the work of Dickson and of Haggerty, and concludes like Arthur that, "Of all the factors which make for progress in primary reading, intelligence [and mental age] are probably the most significant."

One very provocative study tends further to show the significance of mental age to the problem: "when shall reading begin?" Morphett and Washburne ascertained the mental ages (on the Detroit First-Grade and Stanford-Binet intelligence tests) in September, 1928 of 141 beginning first-grade Winnetka children. The mental ages were not disclosed to the children's teachers. In February, 1929, the reading progress of the children was studied in relation to their mental ages. The writers conclude, "it pays to postpone beginning reading until a child has attained a [Detroit] mental age of six years and six months [to seven years]. If this practice is followed, 78 per cent of the children may be expected to make satisfactory general progress; . . . teachers

can [thus] greatly decrease the chances of failure and discouragement and can correspondingly increase their efficiency."

It appears that the intricate process of instruction in reading should be delayed: until children's background of experience and mental growth enable them to find meaning in the tasks presented to them; until this process of maturation has engendered a condition in which reversals are few and perception of words and other meaningful units is possible. This implies that many children would have their introduction to reading when they are about eight years in chronological age. Some, however, will turn spontaneously, joyfully, and *successfully* to reading in Grade I (or earlier). These children are really "ready to read"; hence reading makes a natural (and pleasant) contribution to their maximum growth and experience.

### XI. The Needs of the Adolescent Boy or Girl

How does the adolescent confronted with the exigencies of modern life achieve adjustment, developing into a dependable, happy, useful member of society? One of the major problems involves attaining intellectual independence; another is associated with financial adjustment; a third with economic security. In all of these the role of the home is significant, and suitable adjustment is effected through early and continuous co-operation of school and home. A final consideration in adolescent life involves the integration of the activities of the home, the school, and the agencies of recreation in such a way that a happy, resourceful, and successful personality may emerge.

The problem of dealing effectively with adolescents implies an understanding of the nature of the organism which is at present lacking. During recent years, however, contributions of psychologists, neurologists, analysts, and psychiatrists have resulted in the formation of certain hypotheses which are suggestive and at times helpful. The inchoate nature of our information is vividly illustrated by the diametrically opposed explanations and interpretations of emotional experience and control. But a solid body of verified literature is accumulating; soon, we may hope to guide the adolescent more effectively and to evaluate his adjustment more accurately.

### XII. Characteristic Emotional Patterns of Adolescence<sup>13</sup>

*L. S. Hollingworth*

Most difficult to discuss of all aspects of maturity is emotional maturity. What is meant by saying that a person is emotionally mature? At what age does a person cease to develop in emotional power and control? No established answer exists for either of these questions, so that our discussion must be tentative rather than final.

In the ancient public ceremonies many of the most conspicuous tests of maturity (of fitness for manhood or womanhood) were tests of *capacity to suffer*. Both physical and mental hardships were inflicted as ordeals. The boy

<sup>13</sup> From L. S. Hollingworth, *The Psychology of the Adolescent*. New York: D. Appleton-Century Company, 1928, pp. 207-210.

or girl who raised an outcry, who refused the ordeal, who yielded to fear or pain, failed of initiation. Such were found immature, childish, unready for the responsibilities of the adult. We see, therefore, the savage's recognition of the fact that suffering is one of the cardinal experiences of adult life, and the implication of the public ordeals is that emotional maturity consists in fortitude. There is a course of growth of emotion, just as there is a course of growth of intellect, but psychologists have not charted the former as they have the latter, because methods of measuring emotion have not yet been devised. It is merely by common consent that we have come to recognize typical stages of emotional development. . . .

Emotional control grows with the years, by increments of power from within. However, it is believed by many psychologists that emotional maturity is much more influenced by training and circumstances than is any other phase of development. It is believed that the ultimate courage and patience of a person are more nearly determined by what happens to him during immaturity, than is his height, the thickness of his hair, or his capacity to learn algebra or music.

The direction which it is desirable for experience to take during childhood, in order to produce an emotionally mature person, will be indicated by considering further the criteria of emotional maturity. What are the "signs" that one is no longer childish?

In the first place, the emotionally mature person is capable of *gradations* or *degrees* of emotional response. His is not an all-or-none reaction. If he pinches his finger, he does not yell and weep as loudly as he can. He suppresses the reaction which he feels impelled to make, at least in part. If someone insults him, he does not fly into a towering rage, but limits his anger to a certain degree of response; [he] keeps it "within bounds." If his hat blows off, he does not bellow.

But not only is the mature person able to make partial emotional response; he is also able to *delay* his responses. If he is frightened he does not jump and run on the instant. If he is angered he does not necessarily strike at once. He can check the motor phase of emotion, and may hold it in check for several years, or even for a lifetime. Children, on the other hand, are impulsive and typically "cannot wait" to express or satisfy their desires.

Another indication of maturity lies in the *handling of self-pity*. The human ego is such that any injury to it awakens an inner lamentation, which is out of all proportion to the pity felt by sympathetic onlookers, and comforters. There is certainly a pity of onlookers. It exists and is manifested. But it is far from having the urgency of that felt by the injured person for himself. The "poor-you" attitude is quite different in force from the "poor-me" attitude. In childhood self-pity is unrestrained. The injury to the person strikes at the very center of the universe. The mature person approximates the "poor-you" attitude in pitying his own injuries and mishaps. He tries to feel no sorrier for himself than others would feel for him, and strives against sinking into the "poor-me" attitude, with its childish appeal for a sympathy



from others which they cannot sincerely give. The emotionally mature person does not prey upon the amiability of his fellow men.

### XIII. The Transition from Adolescence to Adequate Adulthood <sup>14</sup>

L. S. Hollingworth

What kind of a person is it, then, who emerges successfully from the period of adolescence, with all of its major problems solved? Such a person will be an adequate adult, fit to engage in the trials of maturity and of old age without "a nervous breakdown."

The adequate adult is able, in the first place, to sustain himself or herself physically. This means economic competence. He is in condition to wait upon himself or to pay directly for the services of others. It is in this fundamental respect that women have had and still have the greatest difficulty in meeting the conditions of adulthood. Because of their part in reproduction, women have been dependent upon men for subsistence instead of being themselves in direct contact with the source of supply. Thus childishness must be expected more commonly in women than in men, for fewer women have been able to achieve self-sustenance by direct effort.

Intellectually, the adequate adult arrives at his own opinions and follows his own conclusions in handling life's difficulties. He does not seek counsel indiscriminately, and is not at the mercy of suggestions which come from the people about him. In short, he is not dependent upon constant advice or admonition. It will be recalled that an ordeal frequently imposed in the primitive coming-of-age ceremonies is the solitary journey, the test of *ability to go alone*.

In the sphere of emotion, the adequate adult is independent of coddling. He or she can suffer without raising an ostentatious lamentation, and without draining the sympathy of others.

The major persistent problems of adolescence are, as we have seen them, to get away from the family, to achieve self-support, to develop a heterosexual attitude, to formulate a point of view on life. When all these major adjustments have been successfully managed, the adolescent has achieved psychological adulthood. He has attained emotional maturity. He has arrived at a condition of self-control and of self-possession, unified and wholesome.

It is true that subsequently the person may still develop and "ripen" in the solution of all these problems; but if he goes wandering on into the years beyond the teens with some or all of them essentially unsolved, he will lack the self-command which underlies adult responsibility. Such a person, in popular phrase, is in danger of "going to pieces," of "going up in the air," of "having a breakdown." Sometimes it is said of him that he "is not all there." In short, that integration of all the various selves into a united Self, which we find in the well-matured adult has been missed. The person continues to

<sup>14</sup> From L. S. Hollingworth, *op. cit.*, pp. 212-214.

behave like an adolescent, or even like a child, for many years or perhaps throughout life.

These perennial adolescents are fairly numerous in society at large, and very troublesome. They are always seeking guidance in their personal affairs; always looking for a listener to their complaints; always trying to elicit sympathy and aid from stronger people as they elicited these from parents at home. No doubt inherited constitution plays a chief role in these failures of adolescence. Some of them would be inevitable because of insufficient stamina in the person. Nevertheless, unfortunate circumstances, wrong training, unsympathetic treatment and want of knowledge at the time of adolescence play chief roles too. Many failures could almost certainly be averted if all of the essential major adjustments which we have described could be carried out under enlightened guidance rather than under the conditions of blind struggle which at present so largely prevail.

#### XIV. The Needs of Exceptional Children <sup>15</sup>

*Paul A. Witty*

Examination of the nature and amount of special education reveals a paucity of provision for all deviates and an expenditure of public funds by no means in accord with the magnitude of the problem, nor in terms of the social benefits which can be obtained through special education.

For example, a conservative estimate shows that there are 300,000 crippled children in the United States. Special education appears essential for about one-third of this number. Less than 15,000, however, are being provided for through the public schools. There are at least 50,000 children who need special education because of defective vision; 5,000 (10 per cent) only are cared for in our 350 special classes; 348 of these classes are located in cities. The deaf are infrequently provided for by 64 residential and 114 public schools for the deaf.

Two to 6 per cent of the general population are decidedly restricted in potentiality for mental development. Nevertheless, only 15 states have enacted special laws to promote identification and care for this large group. A study for one state showed that less than 6 per cent of the estimated number of feeble-minded are being given any kind of special educational provision at public expense.

Scarcely a beginning has been made in efforts to provide special educational opportunities for the gifted. "Gifted" has been interpreted broadly by the Committee on Special Classes in the White House Conference Report, "Special Education: The Handicapped and the Gifted." Six per cent of the school population, approximately 1,500,000 children, require, the workers think, special education to realize their potentialities.

Certainly our greatest natural resource appears to reside in these mentally

<sup>15</sup> From Paul A. Witty, "The Needs of Exceptional Children." *School and Society*, 39, 1934, pp. 102-103, 108.

gifted children. Nevertheless, only 40 cities reported a total of 150 classes.\* Again, the inadequacy of our provision for atypical children is conspicuous. The story is similarly distressing for the remaining types of deviates.

Available facts seem to point to the conclusion that *any child whose behavior is unsatisfactory should have thorough physical, mental, pedagogical and behavior examinations*. Particular needs, then, should be met by prudent expenditure of public funds. The school has four ways of proceeding: through child study departments; through adult and parental education; through mental hygiene instruction for teachers; and through modification in goals and in instructional procedures. In none of these has scientific progress been conspicuous, but in each, progress is sufficient to make us hopeful. The public school is the great social enterprise and laboratory in which the deviate, and the potential delinquent as well, may be identified and developed into an effective citizen.†

Teachers, administrators, and the public should be led to realize the significance and the expediency of the following objective from the Children's Charter: "For every child who is blind, deaf, crippled, or otherwise physically handicapped, and for the child who is mentally handicapped, such measures as will early discover and diagnose his handicap, provide care and treatment, and so train him that he may become an asset to society rather than a liability. Expenses of these services should be borne publicly where they cannot be privately met."

## XV. The Treatment of Atypical Children <sup>16</sup>

*F. E. Howard and F. L. Patry*

Let us now summarily enumerate several guideposts which may assist us in translating into assets liabilities encountered in atypical children:

(1) Size up the individual's assets and liabilities and his ability to balance them. Tests of intelligence, educational achievement, and aptitude may be of much value if we consider them in the light of the facts of the medical examination, emotional, volitional, and temperamental equipment, constitutional and environmental factors. Before intelligent planning can be done, the above essential facts must be at hand and evaluated.

(2) The school program should be individualized and modified so that the child will experience a sense of achievement, satisfaction, and security. Provide adequate outlets and opportunities for expressing and satisfying his emotional strivings and pent-up energy.

(3) Maintain a healthy emotional and ideational atmosphere for the

\* Of course, the number provided for is only a partial measure of adequacy. The inadequacy of provision is clearly revealed also in the type of work provided and in the money spent. For detailed data, see White House Conference Report on "The Handicapped and the Gifted."

† Cf. in this connection: White House Conference Report on "The Delinquent Child," The D. Appleton-Century Company, New York, 1932; and "Crime Prevention through Education," *Research Bulletin of the National Education Association*, Vol. X, No. 4.

<sup>16</sup> From F. E. Howard and F. L. Patry, *Mental Health*. New York: Harper & Brothers, 1935, pp. 282-284.

handicapped child. We must sensitize ourselves to give these children as many lifts as possible in assisting their delicate powers of social adaptation. Remember that children not only are sensitive to their handicap but are very suggestible to implied or direct behavior, overt or implicit, exhibited in others. Do not make gratuitous remarks about his handicap or discuss his symptoms in the child's presence. Implantation of unnecessary fears, anxieties, and conflicts may thus be avoided.

(4) Treat the atypical child as you would a normal child, rather than babying him with overconcern and overprotection. Be objective in your relationships, but sympathetic and eager to fan sparks of personal interest into joy through developing good habits of work, study, play, relaxation, sleep, diet, and elimination.

(5) Prevent occasions giving rise to unhealthy comparisons with other individuals and groups since such a tendency often creates inferiority and failure reactions. Even his own ideals on the basis of real or fancied relationships must be kept in close contact to what he can do comfortably and well and with a sense of satisfaction and achievement.

(6) Remember that our main job is the obligation of reintegration of each child's emotional and intellectual life into a successful and, if possible, marketable social adjustment. It is very important that wholesome patterns of social behavior be developed, and desirable personality, character and citizenship traits be cultivated for each child's own age and social status.

(7) So guide his twenty-four-hour schedule that work, play, social and relaxation outlets will give rise to the cultivation of feelings of security and personal adequacy. Proper elastic grouping and individualized work assignments will do much to further these ends.

(8) Reduce home conflict and strain to a minimum. Parental fears and disharmony are very infectious and unless eliminated will likely be carried over by the child into the school. Thus the teacher, if she would understand her pupil, must obligate herself to know the facts of the home situation. A personal visit to the home of each of her pupils should never be neglected.

(9) Repeated examinations are desirable if we are to forestall pitfalls of lay diagnosis of such pupil problems and the factors entering into them. Medical and psychological rechecks on progress are essential in shaping the course of treatment. Teachers and parents should learn to accept competent medical advice without quibbling or casting doubt on the matter of pupil reconstruction methods. Be frank and honest in your relationships. Shun bribing, threatening, scolding, and coaxing. Insist only on what is really essential for child welfare and social adjustment. Do not misrepresent facts to the child, or cultivate a sense of mental dishonesty in yourself.

(10) Seize every opportunity effectively to integrate the positive contributions of home, school, church and community, and social and civic agencies in promoting the welfare of such children. Harmonious teamwork is essential if we are to live up to our opportunities in transforming personal handicaps into social assets.

(11) Take to heart and put into practice the following point of view of Dr. Harold G. Campbell: "Our job is to make live contacts with the child's inner self and then bring out the best that is in him. Once he has been thrilled by his own capability to do something the urge to know more will follow. Never let it be said that when called upon to solve the educational problem of any boy or girl we threw up our hands and cried, 'It can't be done. This child doesn't want to learn. He can't learn. He doesn't belong in school!' There is no such child. Every child belongs in school and there is something we can do for everyone of them if we but have the determination."

## XVI. The Individual's Choice of Occupation<sup>17</sup>

*Frank E. Howard and F. L. Patry*

The selection of an occupation is a crucial event in the life of an individual. The productive years should be spent where there are service and enjoyment as well as remuneration. Without reasonable survey of one's own equipment and chances for success in a given field there is sure to follow much mental stress and strain even when there is not outright failure. Through the use of tests and ratings now available, and especially through intelligent self-observation, one can determine what line of work he can do best and what he likes best. His first important step is to select within the range of his abilities that which he can do reasonably well with a feeling of satisfaction. Attempting unattainable goals is the cause of much unhappiness. Some people have strong but vague urges to do something great. This is not a help if it never gets beyond the emotional stage, and it may interfere with achievement for it tends to lead to daydreaming, repining, and drifting with the hope that some day the longed-for opportunity may come. Adjusting desires and ambition to fit capabilities demonstrated in concrete performance is a most important condition for enjoyment and success. When rightly conceived and carried out, this adjustment should not cause a man to lose ambition. It should develop a sounder ambition based on reasonable possibilities. In fact, much ambition is only vague desire. Although everyone must take his chances in our present faulty economic and industrial order, a man who persistently studies his job, himself, and his opportunities is practically certain of some personal success. But this is a price that few are willing to pay. Most people could substantially increase the opportunity and pleasure they get from their jobs. A study of the larger field of which the job is a part will often bring a new mental outlook as well as increased vocational opportunities.

Success in a simple task may bring much satisfaction. One of the writers once knew an itinerant scissors grinder who got much pleasure from being recognized in his territory as the best in his class, and especially in having among his customers a number of well-known dressmakers. There has without doubt been considerable loss of satisfaction in workmanship since the

<sup>17</sup> From F. E. Howard and F. L. Patry, *op. cit.*, pp. 87-89.

decline in handicraft. But this loss is not inevitable even in our machine age. If the work in an industrial plant is properly organized and the group morale is right, men may get much satisfaction from machine production. It is not impossible to find factory workmen much interested in their jobs. Anything which gives a man responsibility and recognition brings him pleasure. In his book, *Mainsprings of Men*, Whiting Williams has related his observations of workmen while he studied them first-hand in a variety of jobs disguised as a laborer. His experiences show most emphatically that the wage check is not the workman's only motive. Commenting on this point, he observes,

The pay envelope, as also the worker's joy in possession of his skill and knowing how, is an indispensable part of it all, but except for the satisfaction of a worthy and a recognized service in addition to those essential dollars and cents, our railways, coal mines, steel plants—the whole great edifice of modern industry and life—would slacken down tomorrow because they would cease to call forth what money alone simply cannot buy—the loyalty of men and women to the best they know in themselves.

A second condition in making work contribute most to the general hygiene of living is recognition of the stubborn fact that no job is one hundred per cent attractive. The number of people who are doing just what they like to do most of the time are so few as to be negligible. The message of a retiring college president to his successor, "Life is just one darn thing after another," is an exaggerated but picturesque statement of a condition which need not take the joy out of living but which must be recognized in a sane approach to any job or vocation. Most positions bearing high remuneration and distinction involve responsibilities and duties correspondingly heavy.

It is an obvious fact that all people do not possess equal ability. It is not so obvious, but just as true, that people of equal or comparable ability do not succeed equally well. The traits and habits which interfere with potential achievement are of course legion and often difficult to analyze. Just why one person puts more shots than another into the target of success is a difficult problem. With all the subtle factors of heredity and environment at work it is not easy to explain human failure. Aside from the more obvious major causes such as lack of ambition and energy, insufficient technical training, there are some minor causes of interest to the mental hygienist. Among essentially bad mental habits tending to increase the strain and reduce effectiveness and satisfaction in the work are:

- (1) Carelessness in performing the more unpleasant features of the job.
- (2) Grumbling about matters of small importance. (3) False suspicions and jealousy of others in the same work. (4) Bad temper and bickering in the family out of working hours. (5) A tendency to tire quickly of any kind of work and to be restless and pursue new jobs.

Any one of these may be more detrimental in some persons than in others. In some individuals a trait which in itself would be a handicap may be offset by some balancing factors.

Nobody is perfectly adjusted to all the untoward circumstances of our defective social environment, but re-education is always possible. If one is rightly oriented toward the common personal sources of vocational failure and is willing to change his attitudes and habits and put forth adequate energy to improve, he can deal more effectively with his own shortcomings.

### XVII. The Role of Recreation<sup>18</sup>

*Paul A. Witty*

In the eighteenth century Franke said, "Play must be forbidden in any and all of its forms. . . . Children must be led to see the folly and wastefulness of all play." Educators have been dilatory indeed in abandoning this attitude of our pious forebears; some appear still to believe that "those who play when they are young will play when they are old." Failing to grasp the educative and cultural worth of spontaneous, joyous *activity*, they insist that barren, routine *work* in school is an essential preparation for effective adult life and hence play, as they conceive it, must be prohibited. This anachronistic thought still holds favor in high ranks, and it is responsible for the stifling of most that is creative in children as well as of much that has enduring value.

Psychologists, solemnly, unimaginatively, and seriously bent upon studying play objectively, have sought to *define* the term. Today, we have chapters in our books upon psychology devoted largely to reconciling the various conflicting theories "which seek to explain play."

Many and varied are these explanations of play. Schiller and Spencer long ago stated that the child plays when surplus energy, not needed in direct life demands, accumulates. This theory patently neglects the fact that children play when they are fatigued. Similarly incomplete are the theories of Karl Groos or of Appleton, who allege that children play because they are practicing activities or biological patterns essential in later controlled life. G. Stanley Hall thought that nature provides a continuity and regularity of growth in the individual which parallels the activities of the various species in the evolutionary phylum. And the psychoanalysts assert that children secure through play compensation for precluded desires (such as sex, or mastery). Now, all these and other theories contain some elements of truth, but they are unnecessarily involved. All one needs in order effectively to study and to understand play is a concept that a play activity may be regarded as any form of behavior in which children engage *spontaneously and joyously*. This concept was employed by Lehman and Witty in studying the spontaneous activity of more than 27,000 children.\* Although this concept was used by them simply to provide knowledge of how children utilize their leisure, they recognized that it separates work and recreation. But since the world has effected such a compartmentalization, they believed it important

<sup>18</sup> Adapted from an unpublished manuscript by the compiler of this chapter.

\* Cf. Lehman, H. C., and Witty, P. A., *The Psychology of Play Activities*. New York: Barnes & Co., 1927.

first to ascertain the spontaneous activities characterizing children of different ages; the next step was an attempt to utilize these in correlated (and, consequently, more meaningful and unified) school practice. Some interesting data were secured in these investigations.

The number of play activities participated in decreases with age. The average number of games engaged in (during the period of one week) at eight years was forty for boys and thirty-four for girls. By age sixteen this had dropped to about twenty for both groups. From sixteen years on to twenty-two there was a further drop, but the largest decrease occurred before age sixteen.

Individual variation in play activities decreased with age. When the range in numbers of activities engaged in by the middle 50 per cent of the children for each age was compared, it appeared that the range decreased from about twenty-eight activities for the early ages (eight and nine) to nine for those in the oldest groups. Again, the most rapid decrease was found between ages thirteen to sixteen. This reflects perhaps the influence of conventions upon the activities of young people. Children display their individual interests very freely during childhood, but this expression is curtailed as maturity is approached. Consequently, the leisure activity of adults is typically a narrow stereotype. Now this process of standardizing and restricting interests is of enormous significance. For, in the Western World, industrial and business interests have taken over our recreation and our leisure and have provided innumerable mechanical contrivances for play, as well as multitudinous avenues for commercializing our leisure. Hence, it was found that boys of eight to fifteen years, although relatively free from the surfeit of mechanical devices, gave their time and favor to participating in *games*—football, baseball, basketball, and so forth.

Next in order of popularity among these children were the secondhand play forms—the movie, the comic page, motoring, the radio, and *watching* sports. By the time the boy reached sixteen years of age, he was making a rapid transition to the secondhand and vicarious recreation of the adult. The composite picture of typical adult recreation is indeed desultory. We find that adults, with more time for leisure than ever before in our history succumb to the influence of commercial exploitation. Thus, in a study made by Witty in 1929, adults exhibited an almost universal interest in:

- |                            |                       |
|----------------------------|-----------------------|
| (a) Listening to the radio | (d) Playing bridge    |
| (b) Reading the newspapers | (e) Motoring          |
| (c) Attending the cinema   | (f) Attending parties |

It is difficult, indeed, for any of us to avoid the patterns and vogues so relentlessly enforced by the commercial exploitation which pervades every aspect of contemporary life. The following comments of Stuart Chase illustrate this point:

As a male adult in reasonable health, the play forms which I really love to undertake are these: following mountain trails on foot in summer, on snow shoes



in winter; following lonely reaches of lake and river in a canoe; swimming, sun bathing, and high diving; skating, hockey, tennis and squash. I like to sing with a group. I like to improvise dances, to act charades, to take part in amateur theatricals. None of these things I do particularly well, but all outrank any enjoyment I can suck from motoring, moving pictures, gambling games, night clubs, or watching other people play. And all of them without exception have no basic dependence upon a machine culture. I give this personal exhibit only for what it may be worth, but I fancy that the few of us who follow some such recreational bent have more genuine fun than all the devotees at the twenty billion shrine combined. Meanwhile the great majority of my fellow citizens have had no opportunity to discover the joy, the beauty and the cheapness of genuine play. Trapped in a great city, their habit patterns are geared to more ugly and far more expensive relations, while the economic pressure to hold them to that line is well-nigh relentless.

What the age of machinery has given us in time, it would fain take away again by degrading the opportunities which that time affords; by standardizing our recreations on a quantity production basis, by making us watchers rather than doers, by exploiting our leisure for profit, by surfeiting us with endless mechanical things to monkey with—from gasoline cigar lighters to million dollar cruising yachts—by forcing the pace of competition in play until it turns into work, and above all by brutalizing in recreation millions of human beings who are already brutalized by the psychological imperatives of their daily labor. And it will take more barn dances than Henry Ford can ever pay for to throw off the yoke of that brutality.

But who shall be the winner in another generation, only the gods can tell.

The question arises: What is the logical recourse for interested adults to take in combating the forces which exploit our leisure? I place my hope in an educational process which will create new values. In this process it is essential that many basic concepts of teachers be altered: Let us cease to place education in one compartment and recreation in another. The essential unity and continuity of effective growth must be recognized, and recreation should be viewed as *re-creation*. Teachers and parents should try also to know the child and his problems of adjustment in a very complex, mechanistic world.

Human nature is immensely modifiable, but changes must be made with full knowledge of the nature of each child and his needs. An important first step in understanding each child is to study regularly and systematically his play preferences\* and leisure activity. In attempting to rehabilitate children who come to us as failures and problem cases in school, we have found that a recreational interview gives us significant indications of effective procedures. A recreation chart also has been developed for evaluating children's reading habits, book choices, favorite play activities, wishes, and incidental interests such as vocational, movie, and radio preferences. Through the use of a chart such as this with *all* children, a changed condition involving the total situation may be created. *The aim must be to understand more thoroughly the total*

\* Chapter 14, in *Whither Mankind*, edited by C. A. Beard. New York: Longmans, Green & Co., 1928.

*make-up of each child, and to provide modified teacher-pupil relationships in which child purposes and desires are recognized and given expression.* This involves study of children's manifold interests and an intelligent use of these in redirecting their effort—in enabling them to find meaning, continuity, understanding, and purpose in school-life situations. This procedure is preliminary to the important task of enhancing values and creating new interests in play forms which demand active individual and group participation. This process implies democracy in all avenues of learning; and universal participation in schoolwork is imperative. But universal participation is possible only when there is freedom for individual and group expression in reading, in the arts and crafts—indeed, in every valuable form of recreation. Let us hope that these ideals will soon be reflected in many schools. The closing paragraph from L. P. Jacks contains a promising view of education through recreation:

Beneath all the problems that trouble us today, both industrial and economic, there is one great and fundamental problem we must never lose sight of. It is the problem of keeping up a high quality both of body and mind in the mass of the people. If the human quality goes down, those other problems are bound to go from bad to worse. If the human quality goes up, those other problems will tend to solve themselves. In all the great cities of America I see forces at work which are causing damage to both the bodies and the minds of the people who live in them, especially to the young. The same thing is happening in the cities of the Old World. But counteracting forces are happily at work also. One of the most effective is the movement for providing the people with more and better recreation.\*

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## QUESTIONS

1. Discuss the roles of physiological factors and of environmental conditions as they contribute to the special problems of childhood and adolescence.
2. What are the criteria of emotional maturity?

\* Jacks, L. P., *Education through Recreation*. New York: Harper & Brothers, 1932, p. 155.

3. Cite the age levels wherein problems of adjustment are particularly acute.
4. Discuss the amount and the character of the provision for atypical children in the public schools of America.
5. Give seven or eight principles which should be basic in a program aiming to rehabilitate maladjusted children.
6. State the characteristics of the "emotionally mature adult" and of the "adequate adult."
7. Discuss the manner in which emotional conditioning in infancy determines adult behavior.
8. Define reading readiness and list the essential factors associated with its appearance.
9. Give several definitions of "play" and discuss the therapeutic value of recreation in education.
10. What is meant by "Recreation as re-creation"?

## CHAPTER XXVI<sup>1</sup>

### MODERN PSYCHOLOGIES OF EDUCATION

*O. B. Douglas and B. F. Holland*  
*The University of Texas*

Educational psychologists differ in viewpoints. They may use the methods and the interpretations of behaviorism, be connectionists, stress the genetic approach and the importance of social institutions or emphasize purposive activity and creative experience, adopt the viewpoint of the gestaltists, and so on. Some educational psychologists emphasize process in learning; others stress the products of learning. For one group heredity is the most potent factor in growth; while for others, environment and social institutions are the dominant factors. But such differences are more apparent than real. They reflect individual interests and emphases rather than disagreement in fundamental principles.

#### I. Introduction<sup>2</sup>

*W. H. Kilpatrick*

Until recently our psychology was mainly trying to be "scientific" in the Newtonian sense just discussed. It was atomistic, the small element being the  $S \rightarrow R$  bond or the conditioned reflex. It was dualistic, preferring matter to mind; it built itself on physiology (body) and ultimately on chemistry or physics; it sought to limit and banish mind and thinking, preferring as the basis for education impersonal habits to personal thinking. It seized avidly upon "standardized tests" as permitting an education founded on atomistic objectives as interchangeable as Ford parts, and as allowing besides a non-thinking type of evaluation. It tried to make education mechanical, to have it more easily controlled from without and above.

In direct contrast with all this, psychology is now moving perceptibly away from physiology, which seems but body nonthinking and mechanistic, to biology which gives full sway to all the organism can do; away from atoms like  $S \rightarrow R$  or conditioned reflex to the organism acting as a whole, with thinking, feeling (emotion), impulse, physical moving, glandular action, etc., etc., as aspects (not separable parts) of one organic action. In particular, this better psychology rejects such an analytic procedure as grants the same behavior to small pieces in separation as when in living contents. Learning is increasingly seen as creative of its own subject matter, not simply an acquisition of what was already there.

<sup>1</sup> The selections in this chapter reflect the views of some of our representative educational psychologists. They can be used to supplement the following: Griffith, *An Introduction to Educational Psychology*, Chapter XX; Skinner and Collaborators, *Educational Psychology*, Chapter XXV, and Leary, *Educational Psychology*, Chapter XIII.

<sup>2</sup> From W. H. Kilpatrick, "New Developments, New Demands," *N. E. A. Journal*, 24, 1935, p. 261.

II. Learning <sup>3</sup>

E. L. Thorndike

Human learning consists of changes in the nature and behavior of human beings. Changes in nature are known to us only by changes in behavior. The word *behavior* as used here and later means anything which the human animal does. It includes thoughts and feelings as truly as movements, and makes no assumptions concerning the deeper nature of any of these. It takes them as they are found.

It is convenient to express a man's life in terms of the situations or states of affairs which he encounters, the reactions or responses which he makes to them, and the connections whereby the millions of situations lead to or evoke the responses which they do. The situations and responses of a human life are obviously not haphazard. If a certain situation, call it  $S_1$ , occurs in a certain man's life, he is not equally likely to make any one of the million or more responses which a man can make. On the contrary,  $S_1$  usually has well-marked tendencies to call forth some one particular response or some one of certain few responses. The term *connections* is used to express these tendencies for a given situation to evoke certain responses rather than others. For  $S_1$  to connect with  $R_{27}$  means that  $S_1$  tends to evoke or be followed by  $R_{27}$  more often than a mere haphazard arrangement of situations and responses would allow.

As a man lives and learns, his reaction or response to the same situation or state of affairs changes. Whereas once the question "What is the cube root of sixty-four?" evoked the response of silent indifference or "I don't know" or "What does that mean?" it later evokes a prompt response of "Four." We say that a connection has been formed between *cube root of sixty-four* and *four*.

Such a connection may exist in various degrees of strength. The connection between "Write the word *repeat*" and writing the six letters *r-e-p-e-a-t* in that order may be so strong that the man can always write it even if half asleep, or it may be only strong enough to operate in nine cases out of ten when he is awake and alert; or it may be so weak that it will operate less often than *r-e-p-e-t-e* or *r-e-p-p-e-e-t*.

The strength of a connection between any given situation such as  $S_1$ , and any given response, such as  $R_{27}$ , means the degree of probability that  $S_1$  will be followed by  $R_{27}$ . Thus if  $S_1$  is the thought, "How much is nine times seven?" and  $R_{27}$  is the thought, "Sixty-three," the connection in a person well trained in arithmetic is very strong. If that situation recurs 1,000 times, it will be followed by that response probably in 990 of them. Only very rarely will some other response occur. The strength of  $S_1 \rightarrow R_{27}$  is approximately .990 for that individual. If the same situation occurred in a child just beginning to learn the facts about multiplication by nine and by seven, that connection

<sup>3</sup> From E. L. Thorndike, *Human Learning*. New York: D. Appleton-Century Company, 1931, pp. 4-5.

would be much weaker. It might have a probability of occurrence of only one in four or .250.

Learning consists, in part, of changes in the strength of  $S \rightarrow R$  connections, such as this increase from .250 to .990 for  $S_1 \rightarrow R_{27}$ .

Learning consists also in just having new responses. A person changes who adds to his repertory of say 963,728 responses ten new ones,  $R_{963729}$  to  $R_{963738}$ . These new responses come, however, always in connection with something. For one of them to come into being means that some situation connects with them, and so, as we shall later see, changes the probabilities of response to that situation. So it is a matter of convenience whether we think of learning as acquiring responses and changing the strength of their connections with the situations of life, or as the latter alone.

### III. The Nature of Learning<sup>4</sup>

*H. L. Hollingworth*

Any case of learning ever observed can be described (and thus explained) in terms of this general tendency of living protoplasm to respond to reduced cues. It is no peculiarity of neurons, and no speculation concerning the aesthetics or the social life of neurons is needed to make it intelligible.

The elementary thing about learning is a change in the stimulus, not a change in the response. As for the "connections," there is no reason to speculate about them; single neurons, so far as we now know, are individually capable of reacting to reduced cues, just as other unicellular creatures are. There is even reason to suppose that muscle cells and blood corpuscles do the same thing. And as for the statistical probabilities, they remain unchanged, and hence "connections" cannot refer to statistics. The very first time the sight of fish cakes (mentioned above) led to eating; the sight of acid capsules led to avoidance. They did not, of course, do so *immediately*, but only with the contribution of various other joint stimuli, such as smelling and tasting. It is the elimination of the necessity for these originally requisite "contributing stimuli" that gives us the phenomenon of learning.

There is therefore just one principle that the educator needs to be in possession of, although there are of course many complex details connected with its successful administration. This single principle of education, stated in its most general terms, is: "First discover what antecedents are now required to provoke the desired consequent. Then proceed to effect a reduction in the scope of this antecedent until the expedient degree of cue reduction is achieved." The techniques of cue reduction comprise the details or subject matter of the science of education. Education, in its most explicit form, involves just four achievements:

- (1) The behavior that is desired needs first to be determined (by the teacher, the public, the philosopher, the pupil, or whomsoever is charged with this responsibility).

<sup>4</sup> From H. L. Hollingworth, "What Is Learning?" *Scientific Monthly*, 35, 1932, pp. 64-65; 65.

- (2) A situation needs then to be found which will eventuate in this behavior. If it is desirable that some particular cue be made effective, this must be embedded as a detail or partial feature in this provoking situation, in such a way as not materially to modify the total response.
- (3) By one or more of the various techniques this total provoking stimulus complex must then be reduced. That is, various partial details of it, or the special details determined upon in advance, are made effective cues.
- (4) If possible, sagacity must be promoted. This is simply the co-operation of cues, at least one of which functions for the general life situation or occasion, thus giving the act what we call "relevance." This is what Thorndike calls "having the neurons act with reference one to another." Whether or not this is a modifiable human trait is still doubtful, although it is clearly a variable trait within and among individuals. Capacity for it is one of the most essential mental traits.

. . . . .

Learning can accomplish much. Without learning, indeed, there could be no sagacity. But there can be learning without the latter. Without sagacity, learning is as a sounding brass or a tinkling cymbal. It will function regardless of the occasion. Even if sagacity cannot be taught, as perhaps it cannot, any more than stature can, it may perhaps be promoted. That is, the educator can know the conditions favorable to it. The pupil can be led to discover these favorable conditions and perhaps to foster them in his own life. An emotional attitude, for example, interferes with sagacity, and emotions may perhaps be avoidable to some degree by giving thought to the matter.

#### IV. Functional Psychology <sup>5</sup>

*Glenn D. Higginson*

As is true of other sciences, psychology regards man in a purely naturalistic manner. Its methods must deal with him in terms of his particular functions and their products. Psychology thus finds itself in good scientific company, for biological science in general speaks a functional language. Psychology does not need to travel blindly here. A broad path has been marked out for it by physiology, zoology, and genetics. In these several fields, a major degree of emphasis is placed upon a functional approach to scientific understanding and description. Each of these sciences holds that the functional properties of an organism are to be known and understood only in terms of their respective products. A product may be properly regarded as being one form of an effect which issues from a cause. Causation is necessarily studied in terms of effects. The nature of neural functions, for instance, is known in part by the particular effect which is produced upon a recording apparatus. Functional products vary widely. They are not, of course, to be identified with "secretions." Physiological product is not even restricted to this type. Muscle functions; but its products are not like those of the liver or of

<sup>5</sup> From Glenn D. Higginson, "A Systematic Approach to Psychology in Terms of Function and Product." *Journal of Psychology*, 2, 1936, pp. 2, 14, 15-16.

the spleen. Chemically speaking, the functional properties of an acid are known always in terms of the ways in which it affects some substance under specific conditions. It is known that a slight change in temperature may be accompanied by striking shifts in the changes which an acid produces in a particular substance.

Moreover, all psychological properties (products) belong to the same phenomenal order. That is to say, man is not able to *perceive* objects in their physical forms which he may then possibly *remember* or *imagine* in the form of mental objects. We accordingly imply that, in a functional treatment such as is suggested here, no product of previous function can sensibly be assumed to be stored in man's mind from which it is later revived in memory—no more in fact than the functioning liver stores up the product of previous functioning, bile—which it releases upon some subsequent occasion. At different times and under different conditions, the organism functions differently. Thus, man may perceive at one moment, and remember during another moment. At times, under such conditions as to cause functional products to be very similar or identical, the individual is quite unable to distinguish between two functions, such as perception and memory. The objects which emerge under these functional conditions form an integrated coherent situation. When such life situations are accompanied by striking social or economic effects, an abnormal condition may be assumed to exist. Yet it must be acknowledged here that the genius may observe situations in terms of certain *properties and characteristics to which the average individual actually remains forever a stranger*. What the genius discovers may, after a time, become universally accepted. The individual, insane or genius, in all cases observes, and acts in the light of his needs in accordance with his observations and his situational demands. An individual may possibly fail to observe objects as he previously did, or he may observe objects (sex objects) too often or too long (measured by nonpsychological standards). An exaggeration—too much or too little—may imply an abnormal condition. . . .

Our approach regards man's psychological functions as being just as basically grounded as his physiological functions are. Causally viewed, men are functionally alike because they have a like protoplasm. Perception, memory, imagination, and emotion, for instance, are not functional characteristics which can be "trained in or out" of organisms. This implies that man's brain does not remain functionally inactive until it is taught to be active. But an active brain must always produce; it does not work in a vacuum. Although his many products vary widely with situational demands, man functions continuously. Proper recognition that organic function cannot be stopped and started, as the various operations of a machine are controlled by switches, must contribute materially to an understanding of man. Every physiological function normally goes on continuously. Man is always secreting, excreting, respiring, etc., during every moment of his life. Only the level of all such activities seemingly changes from time to time as in the cases of stomach contractions.



V. The Social Emphasis<sup>6</sup>*C. H. Judd*

It is little wonder that teachers in training and those who are experienced in the handling of pupils find themselves bewildered in their efforts to organize their schoolwork on the basis of the kind of psychology which is thus dispensed to them. The student in the normal school learns long descriptions of instincts and finds himself little prepared by what he has been taught to teach pupils how to spell or multiply. The practical teacher is not a little confused to know what instinctive tendencies are satisfied by the exercises in the school subjects for which the board of education seems to have employed him; so he lays his psychology aside and goes about his daily tasks with the vague feeling, or even a pronounced conviction, that there is something in schoolwork which transcends the theory that he learned in his normal school course.

The fact is that educational psychology is radically deficient. It is in need of revision. It must be made to include a whole series of new chapters. There must be a chapter on the nature of language, one on the nature of the number idea, one on the nature of social customs, such as punctuality and politeness, one on the economic system, and additional chapters dealing with the other social facts which go to make up modern civilization. These chapters will set forth the fact that men have produced, through the co-operation of their minds, certain intellectual and social institutions which are no less real than the objects of the physical world in which we live. These institutions control human life in the highest degree. They have to be accepted by human beings as enormously more important than instinctive tendencies. In fact, the chief reason why men succeed in living together in a productive way is that they do not live by their instincts but under the guidance of farsighted plans of co-operation. Any system of psychology is wholly inadequate as a basis for school practice which overlooks the fact that we live in an environment made up primarily of social institutions rather than of natural objects to which our instincts respond.

Furthermore, when one tries to give an adequate psychological definition of the school, one has to describe it as a place where children are sent to substitute for their instinctive impulses habits which are gradually developed in conformity with social institutions. There is no need of a school to teach children how to swallow. Nature has provided everyone with a well-organized motor mechanism of the instinctive type which takes care of all of the swallowing that the individual will ever have to do. The school does not have to teach children how to smile or how to frown. It does not have to teach them how to protect the eyes by winking or how to use their hands in grasping. These are instinctive acts. The school, however, has to give guidance in the appropriate use of these instincts in order that the right objects shall

<sup>6</sup> From R. M. Ogden, "The Gestalt Psychology of Learning." *Pedagogical Seminary and the Journal*, 25, 1924, pp. 103-105.

be grasped and in order that the smiling shall have the proper relation to good social taste. The school has to supplement natural impulses. Nature does not equip us with the English language or with the power to drive a pencil purposefully across blank paper or with a scheme for counting. The multiplication table is as far removed from instinct as human life is removed from life in an anthill or a beehive.

If the school is to perform efficiently its task of raising human behavior to a level higher than that at which the animals live, it will be necessary for educational psychology to include accounts of the higher forms of activity and to show clearly the steps by which children are to be raised from the forms of behavior for which personal inheritance has prepared them to those which are demanded in human social life.

## VI. Gestalt Psychology

### I. LEARNING <sup>7</sup>

*R. M. Ogden*

Students of education are usually introduced to the subject by means of a course in psychology. Since education is primarily concerned with learning, it seems appropriate that we should begin our study by asking the psychologist to tell us what learning is. So great has been the demand for a first course of this type that the subject of psychology itself has been warped, to the extent that many of its professors now find in learning the central problem of their science. Whether or not the psychologist is the only person competent to tell us about the nature of learning, all will concede that learning is the central problem of education, concerning which a basic view is desirable.

According to the Gestalt view the process of learning, though it has different aspects, is all of a piece. Being "all of a piece" means that any description, whether psychological or physiological, of the figure of behavior which is being learned must emphasize what Lashley calls "ratios," rather than a summation of entities, be they conscious contents or the parts of a biological machine. Learning takes place, not as a compulsory response repeated until it is stamped into a habit, but as a dynamic interplay of forces which excite and thus disturb the equilibrium of the organism. The organism accommodates itself by a redistribution of its inherent energy. This is the meaning of "closure," the search for an appropriate end or solution to the problem that is being learned. But "closure" is not a vitalistic concept. The purpose of the act does not serve as an extraneous guide to behavior; instead, an intrinsic urgency selects a proper course because the right ratios of behavior are prepotent over the wrong ratios. . . .

While the Gestalt view of learning has no recourse to mysticism or moralization, it aims frankly to restore to psychology the rich variety of

<sup>7</sup> From R. M. Ogden, "The Gestalt Psychology of Learning." *Pedagogical Seminary and the Journal of Genetic Psychology*, 38, 1930, pp. 280, 283, 285.

experience which makes of human life an enjoyable adventure. It refuses to restrict itself to the analysis of behavior into what Gesell has called "snatches of random activity," and it boldly maintains that the meaning of behavior is intrinsic and not extrinsic to its very structure. The chapter on learning in our textbooks must therefore be completely revised in order that the function of behavior may become central. The machinelike aspects of behavior can then be relegated to the secondary effects of a differential development. Instead of being original patterns of behavior, reflexes, like habits, are products of development. At a less highly differentiated stage all such activities were performed by the organism as a whole.

It remains to be said that this radical view of learning is not speculative but is the one indicated by recent scientific results in psychology, in biology, and even in physics and chemistry. It is unfortunate that the term *Gestalt* should suggest word-magic, because it is neither a panacea nor a metaphysics, but merely a working hypothesis. The only criticism to which the Gestalt view has proved vulnerable is of its incompleteness; and to this criticism it pleads guilty; for it only tries to state the problems of life and existence in a new way which the facts of life and existence themselves seem to require.

## 2. LEARNING TO THINK<sup>8</sup>

R. Ray Scott

The learning process is primarily a process of learning how to think. I say *primarily*, for there are certain desirable simple skills, or habits, which can be acquired by means largely devoid of thinking, and there may be certain emotional responses which are similarly cultivated. There is a growing conviction that too much emphasis has been placed on the role of habit in human life, and on the corresponding method of drill in education. The reaction is taking the form of a serious questioning of the Thorndikian psychology which has so deeply influenced our educational procedure in the direction of habit formation. The definiteness and plausibility of Thorndike's so-called "laws of learning," and the satisfying simplicity of his famous couplet "stimulus-response" have led to almost universal approval for a kind of training which calls for little thinking. . . .

With the reader's indulgence, we shall now turn our attention at this point to the problem of learning to think. Thinking is primarily a matter of using concepts, and education for thinking is nothing more than education *in* thinking. We may define a concept as a perception of relationship which is not immediately present to the senses. Where does this perception come from? The answer of the older psychology was that it came from the particularization of a preformed latent bond. To the gestaltist, a concept is a construct; it is something new to the individual created through an act of insight. This removes the problem one degree, for we still have to define *insight*. Insight

<sup>8</sup> Scott, R. Ray, "Some Suggestions on Learning from the Point of View of Gestalt Psychology," *Journal of Educational Psychology*, 21, 1930, pp. 361-364.

may be thought of as a function of the configuration. Life is a moving thing, and it moves in the direction of solutions or adaptations. Given a situation which calls for insight, the insight comes to complete the figure. Of course it does not always come, but it is impossible to conceive of an intelligent creature devoid of some measure of insight. The degree of success obtained will depend upon many factors, such as physical heredity, mental heredity, health, emotional state, etc., the relative influence of which is not known. Concepts are not static, notwithstanding they are more or less crystallized into language forms. Through insight, generally facilitated by application, the understanding of the concept is enlarged. The significance of the growth of concepts for adaptive behavior may be seen when it is reflected that at a given point where a certain datum is present as a stimulus, the individual's understanding of the datum is a real part of the stimulus. In this way is a functional unity of individual and environment effected.

### 3. GESTALT AND EDUCATIONAL THEORY <sup>9</sup>

*Kenneth Seltsam*

Before considering organismic, or Gestalt psychology, as it is related to educational theory, it would perhaps be advantageous to inquire into the school's main contentions. Roughly they may be classed under two heads: Those relative to the circumstances involved in any event; and secondly, those pertaining primarily to the individual experienter. To the first of these, would be given the name situation-as-a-whole. A response, the organismic psychologists say, is never to an isolated stimulus. The  $S \rightarrow R$  description of events which is presupposed by the theories of association, attention, and behaviorism is obviously not true to the facts of the case. A response (to state the law of configuration) is made to situation-as-a-whole, and if to any particular detail, always to that detail in its relation to the other details. The organismic position maintains also that the psychological situation is not different from the chemical or physical in its general aspects, and is, therefore, governed by natural laws. . . .

In general, the major contentions of the new school may be summarized very crudely in what would seem for them a definition of the science. Psychology is a science of "wholes" which deals with the responses of organisms-as-wholes to situations-as-wholes. Anything short of these, on the one hand, is essentially physiology, and on the other, physics. . . .

Finally, organismic psychology forces educational philosophy to reconsider whether the hedonic conception, which has abounded since Socrates and no doubt even before, is after all, the true conception. Is "happiness" a goal of man's activity, as such? Does "practice with satisfaction" explain selection for continued usage? Do the very possibilities of attaining happiness fade immediately as that most abstract of all abstract things is aimed toward? If

<sup>9</sup> From Kenneth Seltsam, "Organismic Psychology and Educational Theory." *Journal of Educational Psychology*, 22, 1931, pp. 351-352; 352-353; 358-359.

education is to answer negatively with the Gestalt or organismic psychologists to these questions, the whole view of education will be more or less altered. It will be broadened. The organism to be educated will be seen as an emerged part of a larger whole which in turn, stage by stage, may be said to include the whole universe. The organismic psychologist's "human" is a larger being. He is not an isolated phenomenon depending for his growth upon some philosophically abstract principle. He moves for the same reason that a current of air moves. For him, experience is hearing, seeing, and feeling all at once. He does not see without hearing, nor does he hear without seeing. He matures in the same way that any physical body changes. He is a being "attuned" to the world, and understandable only as such.

## VII. Behaviorism

### I. A DEFINITION<sup>10</sup>

*J. B. Watson*

The behavioristic viewpoint is just common sense grown articulate. Behaviorism is a study of what people *do*. *What is this man doing now?—any answer to that question made by a trained observer is a psychological fact or happening.* After observing man's behavior long enough, the behaviorist begins to say, "this man or that man will do so and so under such and such conditions." Take a simple case. John Smith will run every time he sees a snake. Every woman in this closed room will scream, stand on a chair, or pull her skirts tightly around her if I turn loose ten fierce wild rats. We have begun to make predictions about psychological happenings—the first step in any science.

Every science starts in this way. It observes in a more or less hit-and-miss way the happenings round about. It next gets to the point where it can make *predictions*, e.g., the sun will rise tomorrow—there will be a total eclipse of the sun visible in New York in 2024—Halley's comet will be seen again in 1986, etc.

The next stage of any science is to get "control" of its happenings. Astronomy never can get control. It cannot produce eclipses or prevent them. (Even here possibly we should not be dogmatic!) Chemistry is getting control. Biology is getting control. Can psychology ever get control? Can I make someone who is not afraid of snakes afraid of them and how? Can I take someone who is afraid of snakes and remove that fear? How?

In other words, the starting point of behaviorism is like that of every other science. Looked at in this way, the old, subjective psychology never had any right to be called a science. To be a science, psychology must use the same material that all other sciences use. Its facts must be capable of verification by other capable investigators everywhere. Its methods must be the methods of science in general. . . .

<sup>10</sup> From J. B. Watson, "What Is Behaviorism?" *Harpers Magazine*, 152, 1926, pp. 724, 728-729.

This description serves to locate some of our elementary but basal problems. Having solved these problems, we hope to reach such proficiency in our sciences that we can build any man, starting at birth, into any kind of social or asocial being upon order. On the other hand, we hope some day to attain such proficiency that we can take the worst adult social failure (provided he is biologically sound) pull him apart, psychologically speaking, and give him a new set of works.

Is this goal too ambitious—is it totally unrealizable? Certainly, in adults the goal is still far, far off. Yet we have not lost hope. The difficulty of working with an adult on a behavioristic basis is probably the reason the behaviorist has pursued his studies upon infants and young children so assiduously. Conditions are simpler there.

Hundreds of infants have been under the observation of the behaviorist, but unfortunately not for a sufficient length of time to reveal many of the needed facts. Rich material, however, has grown out of these studies, material which will ultimately give the key to the "control" of adult human behavior.

We can now determine with some accuracy what newborn infants can do. We know the stimuli which will call out their responses. We have something of a picture, too, of what the infant can do at three months of age, at six months, at nine months, at twelve months, and we have a pretty fair picture of how much of this behavior is *born* in and how much of it is *conditioned*.

One startling conclusion seems forced upon us from this study of the first year or two of infancy: The young of the human species perform very much fewer *untutored* (instinctive) acts than anybody had hitherto supposed. The other most interesting fact is that they begin to *learn* to do things—that is, become conditioned—the day they are born.

The behaviorist is now inclined to discard the whole concept of instinct and to believe that almost all of the complicated reactions we see the infant displaying are built in.

We now know how and why human emotional behavior grows up, why some people are fearful, shy, given to anger and rage, why some are jealous, why others shrink into themselves when the voice of authority speaks, why many failures in sex and home adjustment occur. We have experimentally studied the process of the building in of these emotional patterns in infancy; they are pretty well laid down before the end of the second year of infancy. We understand the process and to some extent we can control it. So far as we can judge, most vocational slants are likewise built in at a very early age. The home (mother, father, brother, sister, relatives) is responsible for what the child becomes. Nurture—not nature—is responsible.

The home at present may be said to be a device run for creating the child in the joint image of the parents. Like father like son, like mother like daughter is more than a worn-out platitude. It is a fearful truth. The modern child hardly has a chance for "the pursuit of happiness" which our Constitution so kindly affords him. This conclusion may sound harsh and cruel, but

behaviorism tries to concern itself with finding out what is taking place. When it has pursued its studies further it may be able to help the home, the school, the church, society, to bring up a socialized but individual human product.

## 2. BEHAVIORISM AND EDUCATION<sup>11</sup>

*J. H. Blackhurst*

To conceive of mentality solely as the product of neurophysical activity has a deep significance for education. For, if thinking is but one form of neurophysical activity, i.e., an implicit reaction, the question at once arises as to the relation of these internal thought activities to the external or more explicit activities. May it not be that they mutually influence each other? James has told that our external reactions influence our emotions. If this is so, and I think but few would be inclined to doubt it, may it not well be that this influence extends further than mere momentary emotion or temporary attitude and includes lifelong attitudes as well? Then, too, may it not also affect the more cognitive side of mental activity? Can one as a child, for example, persistently tell that which is false, and later in life, through the process of rationalization, develop strong scruples against lying? Does not our experience rather lead us to believe that it will first be necessary for the individual to change completely his reaction patterns with respect to falsehood and then upon the basis of these new reactions build an ideal with respect to veracity? One's attitude toward veracity may be as much the result of having developed desirable reaction patterns as it is the result of having rationally considered the ethics of the question. In other words, may it not be that our actions influence our thinking in quite as real a sense as our thinking influences our actions? The possibilities are strengthened by the acceptance of behavioristic psychology.

It would seem to the writer, too, that the acceptance of behavioristic psychology would do much to break down the doctrine of formal discipline. Under its guidance we would find ourselves no longer trying to train some nonphysical entity, but rather developing specific neural bonds or definite abilities. We could no longer justify the teaching of subjects to develop, during their study, abilities that were seldom needed outside of the schoolroom, while civic and social abilities were almost entirely neglected. In other words, it would give us a basis for evaluating the units of any given curriculum.

Methods would also come in for their share of modification. For example, we find two widely different points of view as to the teaching of the fundamentals of arithmetic. Some would maintain that in teaching these every effort should be made to give the child a thorough understanding of the process, while others would purposively avoid any effort at rationalization during the period of arithmetical training. It is entirely in keeping with the point of view of the behaviorists to say that arithmetical ability consists in

<sup>11</sup> From J. H. Blackhurst, "The Meaning of Behavioristic Psychology for Education." *Educational Review*, 65, 1923, pp. 148-50.

the formation of the right neural bonds in a given arithmetical situation. Errors result when the neural impulse passes over the wrong synapse, as when the child says nine times eight equals sixty-four rather than seventy-two. The teacher who attempts to analyze the meaning of the expression "nine times eight" so that the child sees it as nine bundles of eight each, is likely to find the child saying in response to the stimulus nine times eight, eight times eight are sixty-four and eight more are seventy-two, thus using two bonds in the place of one. In this manner wasteful reactions accumulate. The teacher who is developing specific abilities and not vaguely training a mind is not so apt to make the mistake of attempting to rationalize at points in which rationalization is almost certain to interfere with the thorough establishment of appropriate neural bonds.

Whatever may be the significance of the behaviorist's point of view to the pure psychologist, there can be no doubt of the fact that it has a significant bearing upon educational psychology.

### VIII. Psychoanalysis<sup>12</sup>

*W. H. Thaler*

The question now arises, How, and in what respects can this process of psychoanalysis assist the educator who is striving by all proven means to arrive at a logical estimate of his ward or pupil? The answer is, that it will help him to solve problems which are even today receiving the same treatment as in the dark ages. By utilizing the process of pedanalysis, we shall be in a better position to understand the pupil who is a deviate or who does not conform to the requirements of what is ordinarily considered a "normal" child. Particularly in the case of the pupil who seems to be in need of extra-curricular instruction, by virtue of manifesting a low I.Q. in his reaction to the general course of study, does this system of analysis appear to offer helpful assistance. The educational world of America is just beginning to awaken from its lethargic stupor in the matter of recognizing the role which physical defects play in handicapping a child with its studies. . . .

Granting, however, that average progress is being made in the line of meeting the subject of physical defects, one may well ask, What are we doing to meet the problem which is being continually presented by the so-called retarded child, who seemingly presents no physical defects of any estimable nature, but which, through some complexity in its mental status, is unable to cope with the requirements of the curriculum? In some states laws have been enacted providing for special schools and ungraded classes, etc., to take care of such cases, being assisted in some [instances] by special appropriations from the state treasuries. The next query which follows in logical sequence is, On the strength of what procedure are we separating the "normal" child from the apparently mentally deficient one? The answer is, by a system of tests

<sup>12</sup> From W. H. Thaler, "The Role of Pedagogic Psychoanalysis in Mental Tests and Measurements," *Education*, 43, 1923, pp. 286-287; 287-288.



and measurements. Now then, on what are mental tests and measurements based in pedagogy? Manifestly, upon the conscious reactions of the pupil to the stimulus of the system of tests to his environment, as elicited by the tester. Under the old system of psychology, which placed nearly all of its stress on the conscious motives of the pupil, this may have been admissible, but today, with all the substantial evidence of the activity and influence of the subliminal, emanating from uncontroversial quarters, it should be recognized that any system which refuses to take heed of this fact is laying itself open to the charge of retrogression, if not injustice, or even worse epithets.

Among some of the facts which place pedanalysis on the list of necessities in the armamentarium of the educator is the outstanding one that the very manifestations which cause the educator to place the child on the subnormal plane very frequently arise from some complexity of the subconscious paths in the mind, and when this is determined by analysis and adjusted, the pupil takes his place among the normals. In his experience as a school physician, the writer has examined hundreds of children preparatory to the process of mental tests and measurements. It is a matter of no small relevancy that a very small proportion of these were found suitable for individual instruction in special schools. The greatest number were eventually either sent back to their regular rooms or placed in ungraded classes, with a special suggestion to the teacher to try and "reach" the pupil by paying special attention to some particular phase of instruction. What does all this suggest? Is the curriculum wrong? Since the great majority seem to be making rational progress in conformance with community and economic demands, we must assume that the course of study is as efficient as modern enlightenment in pedagogy permits. Was the psychology taught at the normal school or teacher's college at fault, in that only the conscious mind received recognition? The writer believes that herein is contained the crux of the matter. So long as prospective teachers are taught simply to deal with the superficial reactions and conscious manifestations of the child mind, without giving consideration to the origin of the conscious evidences, so long will we be in the dark and continue to squander time and energy in attempting to arrive at a justifiable conclusion.

## IX. Conclusion<sup>13</sup>

*L. A. Pechstein*

On the positive side, the science of education desires much of psychology. First, it wants all its data which, through application, will help education handle its problems. It wants some of its own men trained in rigid experimental psychology, or perhaps equally as well in some more exact science, so that a certain attitude of mind may be secured. Occasionally it wants a particular method devised by the pure psychologist, as e.g., the quantitative methodology of mental age. Second, it wants, and quite vainly to date to my way of thinking, a basic systematic foundation upon which it may build. A

<sup>13</sup> From L. A. Pechstein, "Psychology for Education." *School and Society*, 23, 1926, pp. 349-350; 350.

survey of systematic psychology proves disappointing, both intrinsically and extrinsically for fundamental purposes of education. Where has the psychological system of structuralism led? To a barren description like to how a house is wired for electricity, yet without attention to the essential, the juice itself, or the usefulness or employment by human beings. What has functionalism done for educational foundations? Narrowed to the play of consciousness and impregnated with the flavor of biology, 'tis true; with purposive psychology it has set up a system of mechanisms—instinctive, etc.—which, for sheer educational purposes, have been not only full of sound and fury, signifying nothing, but have misguided an all too-gullible education. Gestalt? A note of hope, emphasizing a unifying principle of mind and action. Behaviorism, shorn of its extravagancies, and its at least near-eroticism, throwing more light upon the educative process than all structuralism and functionalism and purposism combined. Yet confusion within the psychology camp brings dismay abroad, and education builds experimental superstructures upon such unstable foundations as it needs must do, pending the day when psychology will provide a sure systematic foundation upon which education may rest secure. Third, education needs a unifying psychological principle for the enormous field of learning. The structuralistic elements and the functional capacities of mind, perhaps even the Gestalt units, fail in the actual learning situations. . . .

Fourth, and related to the above, education needs to have psychology give it a working theory of intellect. Thorndike's bond psychology, call it simple or simple-minded as one pleases, has borne wonderful fruit in a theoretical phrasing of intelligence in understandable terms of its surface nature, and the variables of range, quality, height, and speed. The theory of evolution becomes pregnant with values for education and other sciences. A sound theory of intellect, taken in conjunction with a principle (like the conditioned reflex perhaps) showing how association or connection forming or detaching actually operates, will be fraught with unlimited applications in those educational situations where teachers, forced to become applied psychologists, are regularly at work conditioning responses, setting up associative bonds, etc., even if blindly and largely by trial and error. . . .

Of course, by reciprocity, psychology desires something of education. First, it properly wants to borrow, for its own experimental laboratories, some of the vitalizing problems educational ingenuity or need has turned up. Perchance it may properly claim these applied problems, and then go to work to seek out the principles underlying the application. Second, psychology desires that educators maintain a more critical and scientific attitude in handling those borderline problems which each may claim. Herein their interests are one, and likewise their pride in scientific achievement. Finally, psychology may well ask to be let alone, to face without criticism or embarrassment, its problems in pure research, quite irrespective [of] how far removed these may be from the immediate or even ultimate interest, of the arch borrower of the scientific world, namely, the educationalist.

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## EXERCISES

1. If psychology adopts a biological instead of a physiological basis, what are some of the changes in emphasis that will be made in educational theory and practice.
2. Distinguish between the view of learning presented by Thorndike and that by Hollingworth. Which does our present educational psychology follow more closely? Why?
3. What does Higginson mean by a "psychological product"? Are there many such products? Do they occur at the same time in the same individual? Why?
4. Would it be possible to use Thorndike's psychology of bonds and Judd's psychology of social institutions in formulating a psychology of arithmetic? Why?
5. Compare Gestalt and behavioristic psychology as to (a) methods of investigation; (b) completeness of system; and (c) usability as a basis for education.
6. Which point of view presented in this chapter lends itself best to (a) dealing with behavior problems in school; (b) correcting emotional maladjustment; and (c) learning such school subjects as reading and writing.
7. In what field of education does psychoanalysis seem to give greatest promise of usefulness? Why?
8. List the contributions to education that have been made by each type of psychology represented in this chapter.
9. Do you agree with Pechstein on his four points? Can you add others?
10. Is it possible for the educational procedures of the future to be founded on a combination of our present points of view in psychology, or will there be of necessity a new "system" as a basis? Why?

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